PIT AND QUARRY

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DEC - 8 1940
PERIODICAL DIVISION

DECEMBER, 1940

Manufacture of Many Kinds of Cement Made Possible by Use of Flotation System
A New Ohio Lime Plant . . . Aggregates Production for a Flood-Control Project

LUDLOW-SAYLOR

CONTROLLED-TEMPER SUPER-LOY WOVEN WIRE SCREENS

for super-severe service

●

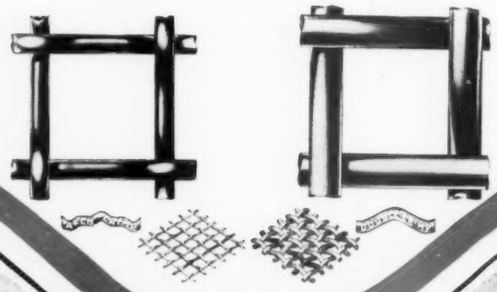
SUPER-HARD, SUPER-TOUGH, SUPER-STRONG

CONTROLLED-TEMPER SUPER-LOY WOVEN WIRE SCREENS

withstand abrasion longer—

endure vibration better—

resist fatigue to the utmost



The background at top of page shows the "Perfect" Double-Crimp Weave.

The small cuts in the center panel compare Arch-Crimp Weave and Double-Crimp Weave.

The border at foot of page shows "Perfect" Double-Crimp Steel Wire Cloth which has been hot-dip galvanized after weaving.

Samples on request.

The LUDLOW-SAYLOR WIRE COMPANY
SAINT LOUIS

Sprocket Wheels

THAT FIT AND LAST

25,000 ALWAYS IN STOCK
★ CUT OR CAST TOOTH ★

● Every Link-Belt sprocket is carefully fitted to the chain. This final step in the highly-developed Link-Belt process of sprocket manufacture eliminates the "break-in" period—a period of accelerated wear on the chain, as well—yet it costs you nothing extra.

Get them right from stock—bored and keyseated to your order, ready to install. We can also give you quick and efficient service on cut and cast tooth gears.

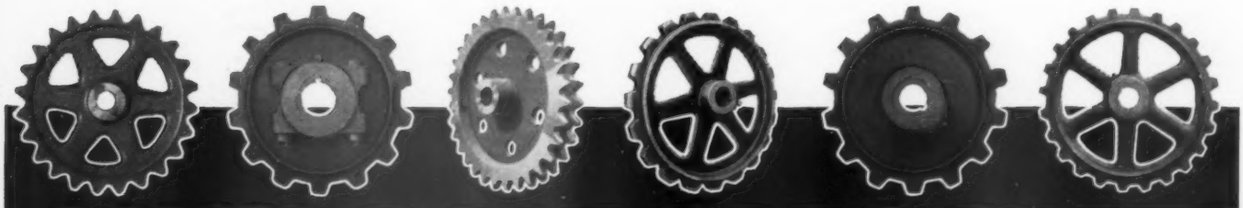
General Catalog No. 800 shows the complete line with stock sizes indicated. If you don't have a copy, send for one today.

LINK-BELT COMPANY

Chicago, Indianapolis, Philadelphia, Atlanta, Dallas, San Francisco, Detroit, Los Angeles, Boston, Seattle, Portland, Ore., Toronto. Other offices and distributors in principal cities.

>FLINT-RIM< WHEELS LAST SEVERAL TIMES AS LONG AS GRAY IRON WHEELS

—resistant to abrasive wear. Chain lasts longer, too, because correct initial tooth pitch is preserved. The rim section illustrated above shows depth of gile-hard contact surfaces. 834



LINK-BELT SPROCKETS

PIT AND QUARRY, December, 1940, Vol. 33, No. 6. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago, Ill. Subscription price $1 for 1 year in the U. S. and possessions, Canada, Central and South America; elsewhere $1 additional for each year. Single copies 50 cents. Entered as second-class matter February 28, 1932, at the Post Office at Chicago, Ill., under the Act of March 3, 1897.

● Regardless of the machine or job—shovel, crane, hoist, scraper, elevator, whatnot—Hazard LAY-SET Preformed will give you the same amazing resistance to fatigue, the same uniformly long life—because Hazard LAY-SET is *"at ease."* The preforming process at the mill relieves the rope of locked up stresses; leaves it flexible, easy to handle, willing to work. Hazard LAY-SET Preformed is so calm, so thoroughly "at ease," that it has almost no tendency to kink, it resists whipping or rotating in sheave grooves, it spools better. More than this Hazard LAY-SET Preformed is a safer rope to handle. Being "at ease" broken crown wires do not spring out to tear workmen's hands and possibly cause blood-poisoning. For your next rope specify Hazard LAY-SET Preformed and be "at ease" yourself about its greater dollar value.

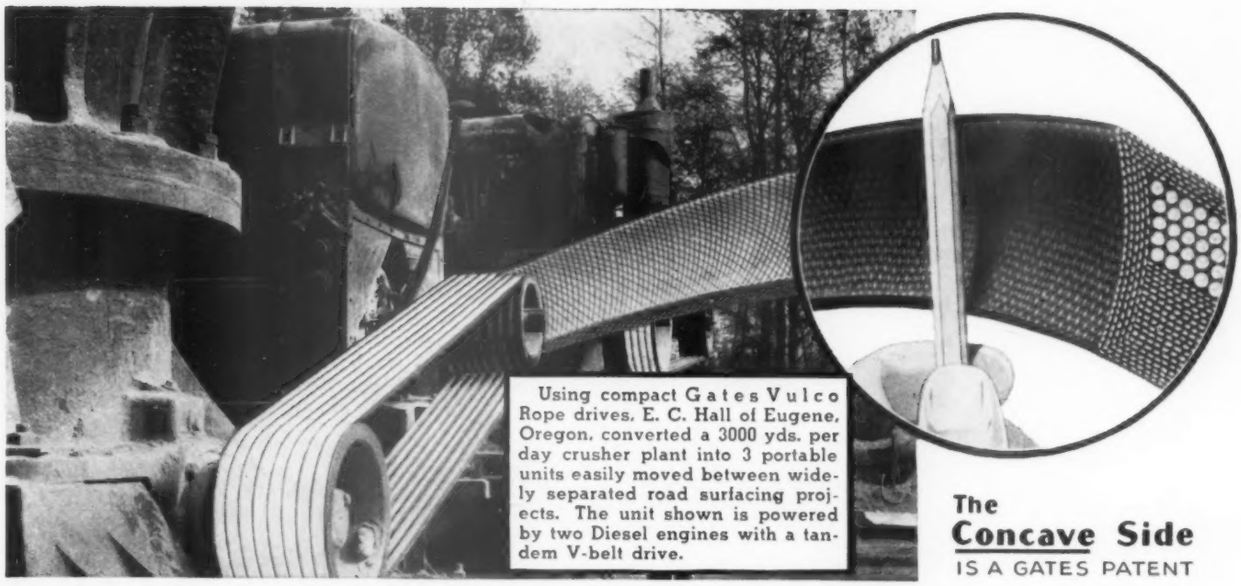
HAZARD WIRE ROPE DIVISION • WILKES-BARRE, PENNSYLVANIA

Established 1846

District Offices: New York, Chicago, Philadelphia, Pittsburgh, Fort Wayne, San Francisco, Denver, Los Angeles, Atlanta, Tacoma

GREEN SIGNIFIES SAFETY

AMERICAN CHAIN & CABLE COMPANY, Inc.



Using compact Gates Vulco Rope drives, E. C. Hall of Eugene, Oregon, converted a 3000 yds. per day crusher plant into 3 portable units easily moved between widely separated road surfacing projects. The unit shown is powered by two Diesel engines with a tandem V-belt drive.

The **Concave** Side
IS A GATES PATENT

In Two Minutes *This Test* Will Show You a big SAVING in V-Belts and Power

If you are interested in low operating costs, make this simple test:

Take *any* V-belt and have someone bend it as it bends in going around a pulley. (See photo above.) As the belt bends, grip its sidewalls between your finger and thumb. You will feel the belt's sides bulge outward.

This bulging gives a straight-sided belt the shape shown in figure 1, on the right . Clearly, this shape does not fit the sheave groove.

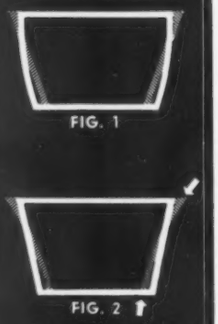
But when you bend a belt that is built with the patented Concave side, you find that the sides become perfectly straight—as shown in figure 2. Here are the advantages: This shape exactly fits the sheave groove; this means uniform sidewall wear—longer life! Also, the full side of the belt is gripping the pulley; therefore less slippage and this saves belts as well as power.

V-Belt In Sheave

It's the *sides* of a V-Belt that do all the gripping and get all the wear. That's why longer life for the *sides* means *longer life for the belt.*

The Gates Vulco Rope is the only V-belt built with the Patented concave side.

What Happens When a V-Belt Bends



THE GATES RUBBER COMPANY

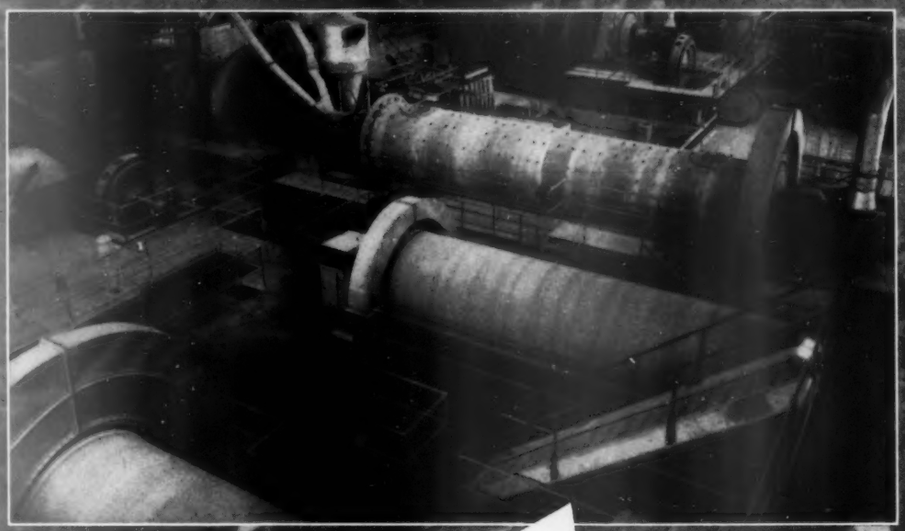
Engineering Offices and Stocks in All Large Industrial Centers

GATES VULCO ROPE DRIVES

CHICAGO, ILL., 1524 South Western Ave. HOBOKEN, N. J., Terminal Building BIRMINGHAM, ALA., 1631 1st Ave., S. LOS ANGELES, CAL., 2240 E. Wash. Blvd.

DENVER, COLO., 999 South Broadway DALLAS, TEX., 2213 Griffin Street PORTLAND, ORE., 333 N. W. 5th Ave. SAN FRANCISCO, CAL., 2700 16th St.

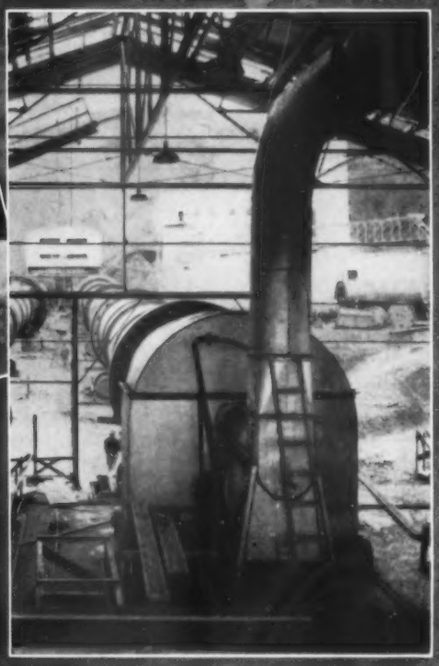
TRAYLOR



TRAYLOR EQUIPMENT at PERMANENTE

1 - 12'-0" x 450'-0" ROTARY KILN
WITH
TRAYLOR-CHEESMAN BURNER SYSTEM
1 - 11'-6" x 120'-0" ROTARY COOLER
1 - 8'-0" x 40'-0" BALL MILL
1 - 7'-0" x 26'-0" BALL MILL
3 - 9'-6" x 10'-0" BALL MILLS
3 - 72" SLURRY FEEDERS
2 - 3'-0" TY REDUCTION CRUSHERS
1 - #6 BH REDUCTION CRUSHER

at PERMANENTE



PHOTOS BY SUMPUL, SAN JOSE, CAL.

TRAYLOR

ENGINEERING & MANUFACTURING CO.

MAIN OFFICE AND WORKS — ALLENTOWN, PENNA., U.S.A.

Short Cut TO Economy

• Many a truck operator, after trying first one make then another, has standardized on Ford equipment. Others do it much sooner. They *start* with Ford Trucks and never change.

• If you're in the market for a new truck, take the short cut to economy. Get a Ford. And with it, get a brand-new idea of savings. Ask any Ford dealer about an "on-the-job" test.

Here's Truck Value!

★ Choice of 2 improved V-8 engines—85 or 95 hp.

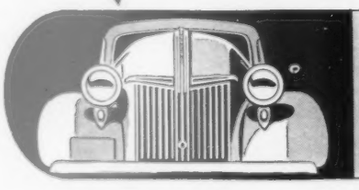
★ New 4-cylinder super-economy engine, optional in Commercial Cars and 122-inch trucks.

★ Beautiful modern styling—an important asset to your business.

★ Rugged, dependable full-floating rear axles in all trucks. ¾-floating in Commercial Cars.

★ Improved rear springs (main and auxiliary) on Regular and C.-O.-E. Trucks for heavy duty.

FOR '41 - PUT A FORD TO WORK!



1941 FORD TRUCKS

FORD MOTOR COMPANY, BUILDERS OF FORD V-8 AND MERCURY CARS, FORD TRUCKS, COMMERCIAL CARS, STATION WAGONS AND TRANSIT BUSES

7000 Tons of Limestone

P-U-S-H-E-D OUT *and*

HERE'S one for the textbooks—a perfect example of controlled blasting at the Luckey, Ohio, quarry of the National Gypsum Company.

Just look at that heaving action in the center photograph! Tons of limestone pushed out by the "controlled force" of Atlas explosives fired with Atlas electric blasting caps — without a sign of escaping gases!

The Atlas Representative can help you get the maximum effect, with minimum waste, from Atlas explosives on your job. Talk it over with him the next time he drops around.

DROPPED

right at the face . . . where it's wanted!

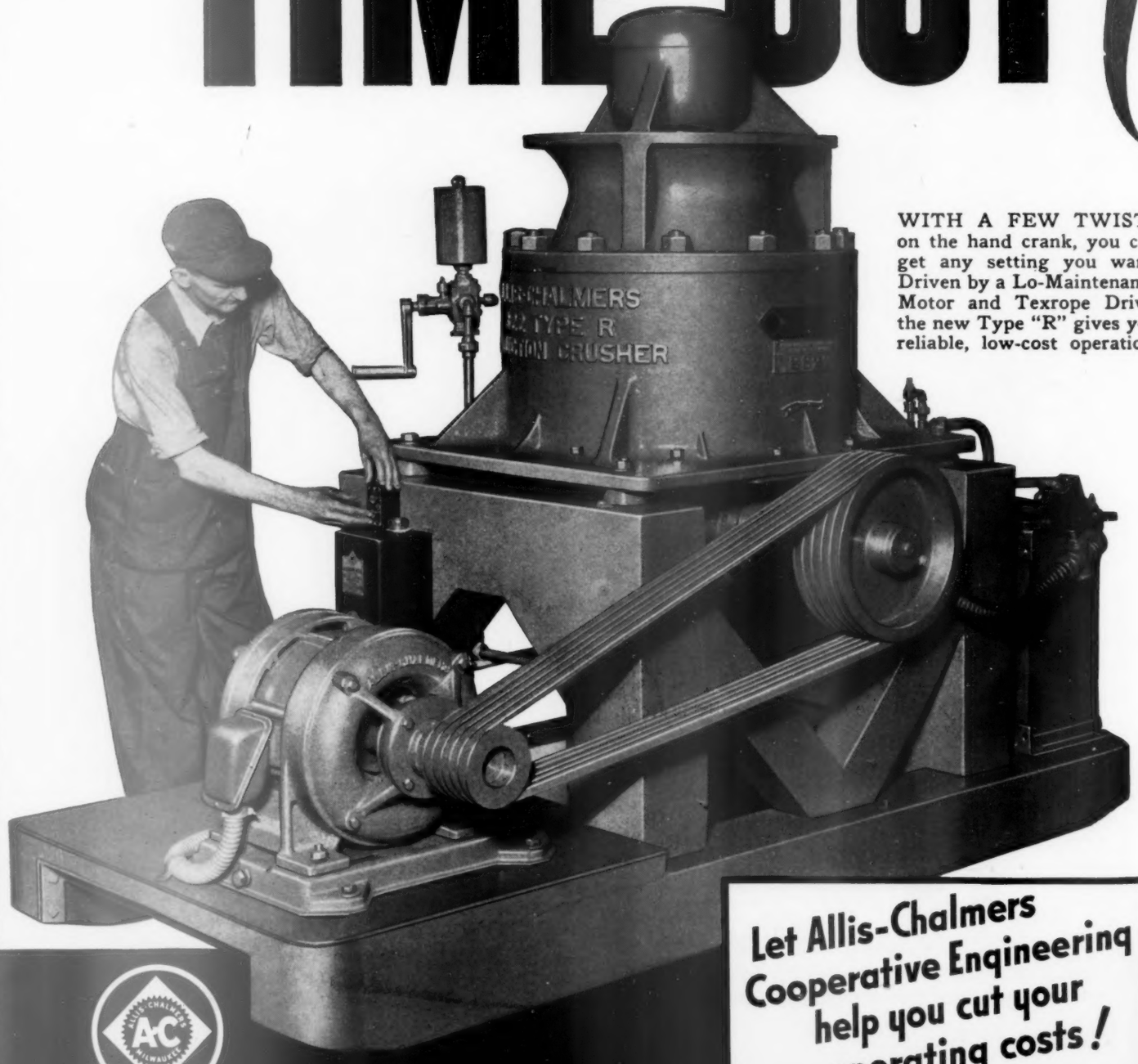
ATLAS EXPLOSIVES *"Everything for Blasting"*

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington, Del. • Offices in principal cities • Cable Address—Atpowco

NEW LOW COST TYPE "R" CRUSHER

TAKES LESS TIME OUT



WITH A FEW TWISTS on the hand crank, you can get any setting you want. Driven by a Lo-Maintenance Motor and Texrope Drive, the new Type "R" gives you reliable, low-cost operation.

Let Allis-Chalmers Cooperative Engineering help you cut your operating costs!

for SETTINGS . . . for TRAMP IRON . . . for POWER INTERRUPTIONS!

Three-Way Time-Saving Features of New Allis-Chalmers Type "R" Crusher Give you Quantity Production of Uniform, Cubical Product . . . at LOWER COST! Read This Money-Saving News about the Fast-Selling Type "R" You Can Get at a Price Below Any Comparable Fine Reduction Crusher on the Market Today!

WE SINCERELY believe the new Type "R" Crusher is the answer to the industry's demand for a low-cost crusher capable of high capacities . . . a uniform, cubical product. And here's why!

LESS TIME OUT FOR SETTING! You can change settings for size with the Type "R" *in less time* . . . with a few twists of a hand crank. Built-in hydraulic jack does the work for you . . . gives you an exact setting anywhere within the range of this modern, low-cost crusher.

LESS TIME OUT FOR TRAMP IRON! You get greater protection from tramp iron with the Type "R". The effective release device passes ordinary tramp iron *fast* . . . protects your crusher . . . minimizes outage time.

LESS TIME OUT FOR POWER INTERRUPTIONS! Here's what actually happened in a large eastern crushing plant when a power interruption left the crushing chambers jammed with feed. It took 2½ hours to put their ordinary crusher back in operation . . . but their Type "R" was turning out stone after only a 15 minute delay! Think what dividing your lost production time by *ten* could mean to the production schedule in your plant!

Remember . . . 322 Type "R" Reduction Crushers are carried in stock . . . ready for immediate delivery anywhere! And here's the clincher — you get the Type "R" Crusher with all its money-saving features at a *cost that's actually less* than you pay for any comparable machine on the market today!

Get Cost-Cutting Service!

When you install a Type "R" Crusher . . . or any one of the complete line of Allis-Chalmers products . . . you're sure you get equipment that gives you long years of cost-cutting service.

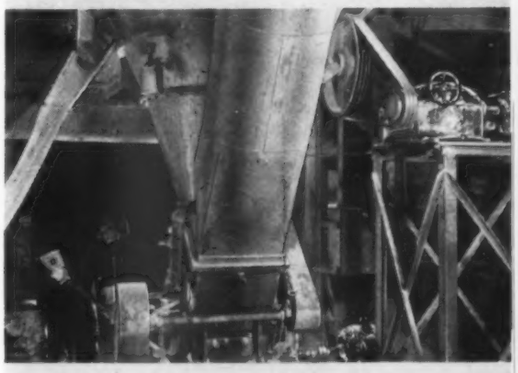
Whenever you have a problem that needs real engineering, Allis-Chalmers cooperative engineering can save you money. Working with your own engineers, the Allis-Chalmers crushing specialists will be glad to analyze your problem . . . give you an unbiased recommendation for the most economical solution. Get in touch with the district office near you, or write direct to Allis-Chalmers, Milwaukee, Wis.

ALLIS-CHALMERS

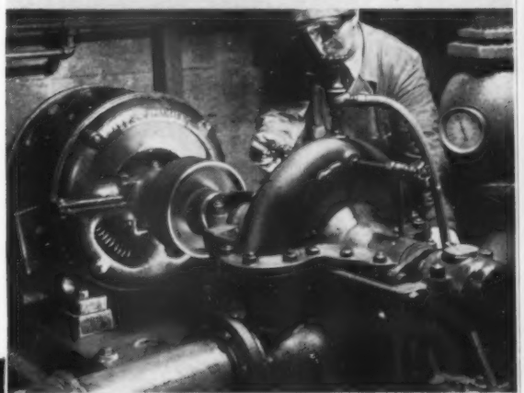
MILWAUKEE · WISCONSIN

News of other Allis-Chalmers Products that cut your costs!

IN CRUSHING PLANTS ALL over the country, the Allis-Chalmers Low-Head is proving why it's the fastest selling screen on the market today. Space-saving adaptability plus positive vibration give you a better product at lower cost.



SENSITIVE, RELIABLE VAriable speed control is obtained with the Allis-Chalmers Vari-Pitch Speed Changer. Here is a unit driving a separator in a mid-western lime plant.



MORE WATER AT LESS cost . . . that's the reason Allis-Chalmers centrifugal pumps are a favorite among operators for washing, drainage and allied crushing plant applications.

CUT YOUR CABLE COST

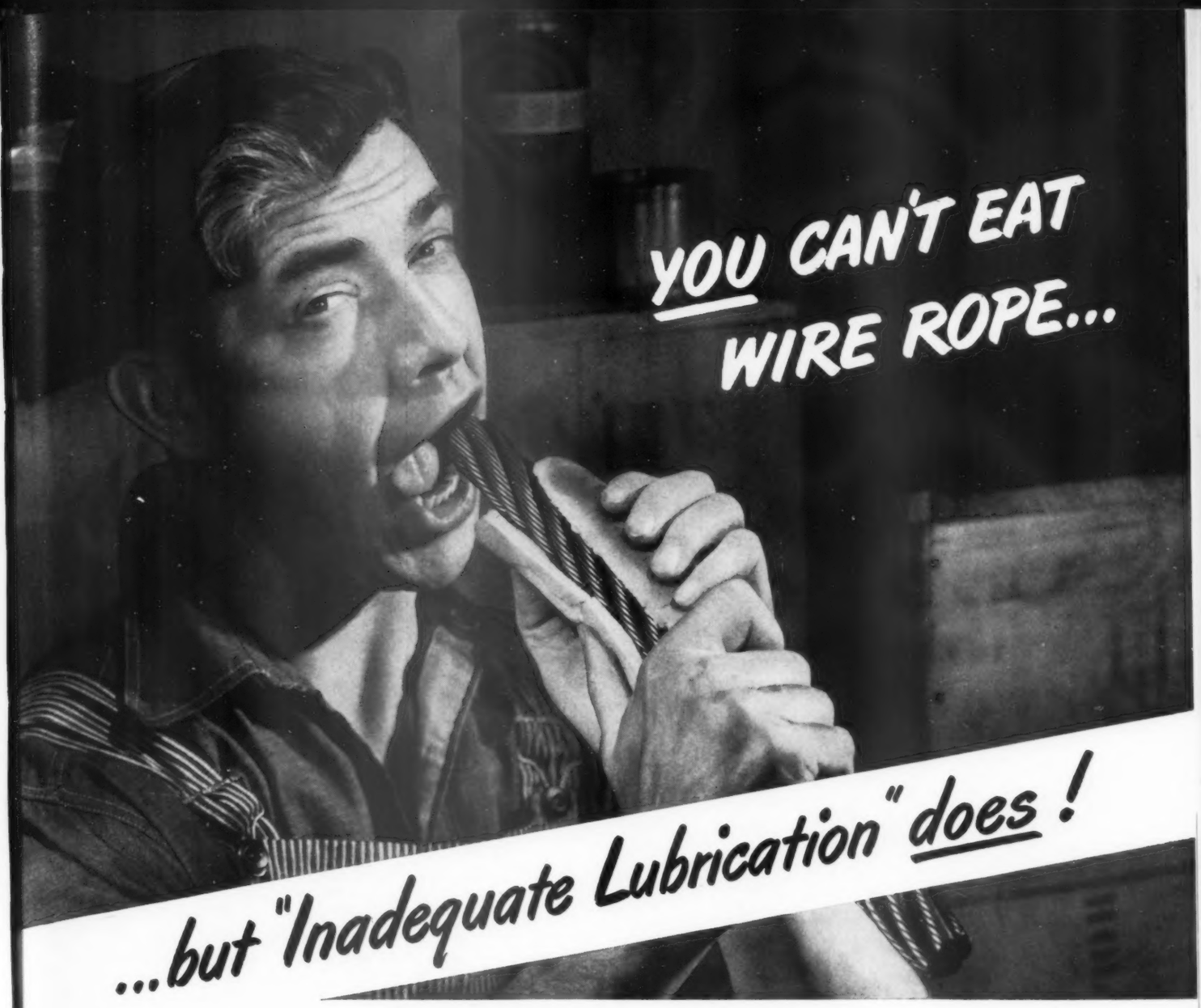
You can reduce dragline cable wear... and cut your cable cost... by owning a Koehring Dragline. Two important advantages are responsible for the decreased dragline cable wear—(1) *Boom foot* swiveling fairlead and (2) *Boom point* swiveling fairlead. Insist on *both* for your next dragline. The swiveling *boom foot* fairlead maintains a straight cable lead to the bucket, reducing cable wear. The Koehring swiveling *boom point* fairlead maintains a straight cable lead from boom point sheave to bucket, regardless of position, reducing cable wear.

KOEHRING COMPANY
MILWAUKEE • WISCONSIN

Boom foot fairlead, swivels to maintain straight cable lead.

Koehring *boom point* swiveling fairlead maintains straight cable lead from sheave to bucket.

HEAVY-DUTY CONSTRUCTION EQUIPMENT



Perhaps you never thought of lubrication in just this way — but picture to yourself thousands of tiny "bearings" sliding and pressing against each other. Naturally, they must be lubricated — and naturally you'll see that they are lubricated in your wire ropes — when you realize what it means in dollars and cents.

A proper wire rope lubricant regularly applied to the rope on the job, forms a protective coating that keeps those thousands of "bearings" operating with minimum friction. The result: — Wire fatigue and corrosion checked; more uniform wear; longer rope life.

Be sure your lubricant is the *right* one, that you are applying it properly and with sufficient frequency.

JOHN A. ROEBLING'S SONS CO.
Trenton, N. J. *Branches in Principal Cities*

CORRECT LUBRICATION:

1. *Reduces Rope Wear*
2. *Prevents Corrosion*
3. *Prolongs Rope Life*
4. *Lowers Operating Cost*
5. *Provides Greater Safety*

This advertisement is published in the interest of all wire rope users to help them obtain greater safety, service and efficiency from their wire rope.

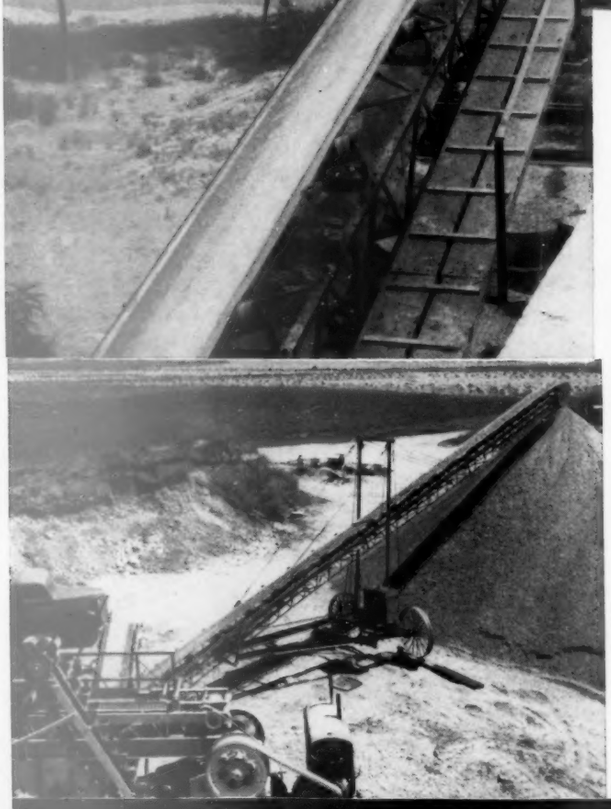
ROEBLING

JAR *Wire Rope*

Ask about ROEBLING "BLUE CENTER" WIRE ROPE *either preformed or standard*

★ PREPARE

National Defense Awards with



★ *Getting the correct modern equipment may become the "neck of the bottle" on National Defense jobs. Get your files up-to-date with complete information on these up-to-the-minute Barber-Greenes.*

CONVEYORS

Since almost any expansion in your plant will include belt conveyors, you should have the 108 page Barber-Greene Belt Conveyor Catalog NOW to study the many conveyor applications, ideas, and engineering data. See how much Barber-Greene's Standardized Sectional Construction simplifies and speeds up delivery and erection. See how the B-G Standardized Factory-aligned Terminals assure dependable, trouble-free operation, and most important, see how Barber-Greenes are easily moved, rearranged, lengthened, shortened, or otherwise altered to meet future expansion or plant revision.

Many are taking advantage of Barber-Greene's experience and ingenuity in solving material handling, and plant layout problems. Phone, write, or wire for the Conveyor Catalog or engineering assistance. There is no obligation.

STANDARDIZED MATERIAL HANDLING MACHINES

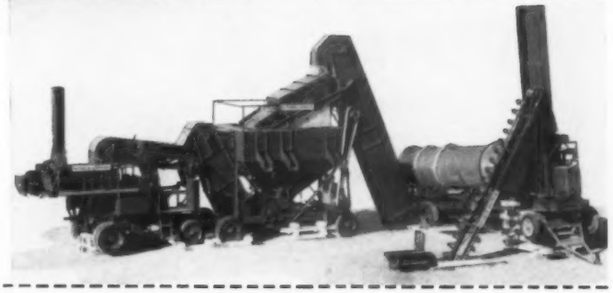
BARBER-

YOURSELF for complete Barber-Greene Information

BUCKET LOADERS

Twenty years of proof stand behind the claim that the least expensive way to load is with Barber-Greene Bucket Loaders. Above right is the High Capacity Crawler Mounted Model 82-A. Also available is the smaller crawler mounted 552.

The Pneumatic Tired Mounted Model 522 (above left) has made bucket loader history. Available with low boom and swivel conveyor or with conventional high boom and spout as shown. It has proven to be not only the answer for the small operator, but ideal on small or scattered jobs in large plants.



BITUMINOUS PLANTS

The B-G Bituminous Mixer is available in a wide range of sizes including the small "Maintenance Plant." Available for single or multiple aggregates, with or without dryer.

Mail today . . . . .

Just clip this coupon to your letterhead and check the items on which you would like complete information. There is a booklet on each subject. No obligation.

☐ CONVEYORS PORTABLE ☐ LOADERS

☐ CONVEYORS PERMANENT ☐ BITUMINOUS PLANTS

40-16 Barber-Greene Company, Aurora, Illinois

BARBER-GREENE

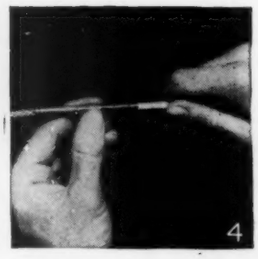
STANDARDIZED MATERIAL HANDLING MACHINES

FIRE IT *right*

Primacord is detonated by a fuse-and-cap, or an electric blasting cap. This is the *only* cap required for the entire blast, whether there is one hole, or a thousand. It is attached only *after* all holes have been loaded and tamped — *after* all connections have been made — *after* all equipment and lines have been removed — *after* all men have gone to a place of safety.

The cap detonates the PETN core of Primacord, releasing the powerful wave that travels 3.85 miles per second, detonating every cartridge in the entire blast.

Primacord gives you more profitable blasting — saves time, labor, money. We shall be glad to send you a free copy of the Primacord Booklet.



PRIMACORD·BICKFORD

Detonating FUSE

THE ENSIGN-BICKFORD CO., Simsbury, Conn.

Makers of Cordeau-Bickford Detonating Fuse — and Safety Fuse since 1836

PB26

1. Tie through cartridge.
2. Half hitch branch to main line.
3. Connect main line lengths with square knot.
4. Fuse and cap on end of main line.

IMPORTANT: Branch lines should lead away from main lines at *right angles.* Avoid kinks and small loops.

NORTHWEST

DUAL CROWD

INDEPENDENT PLUS AUTOMATIC

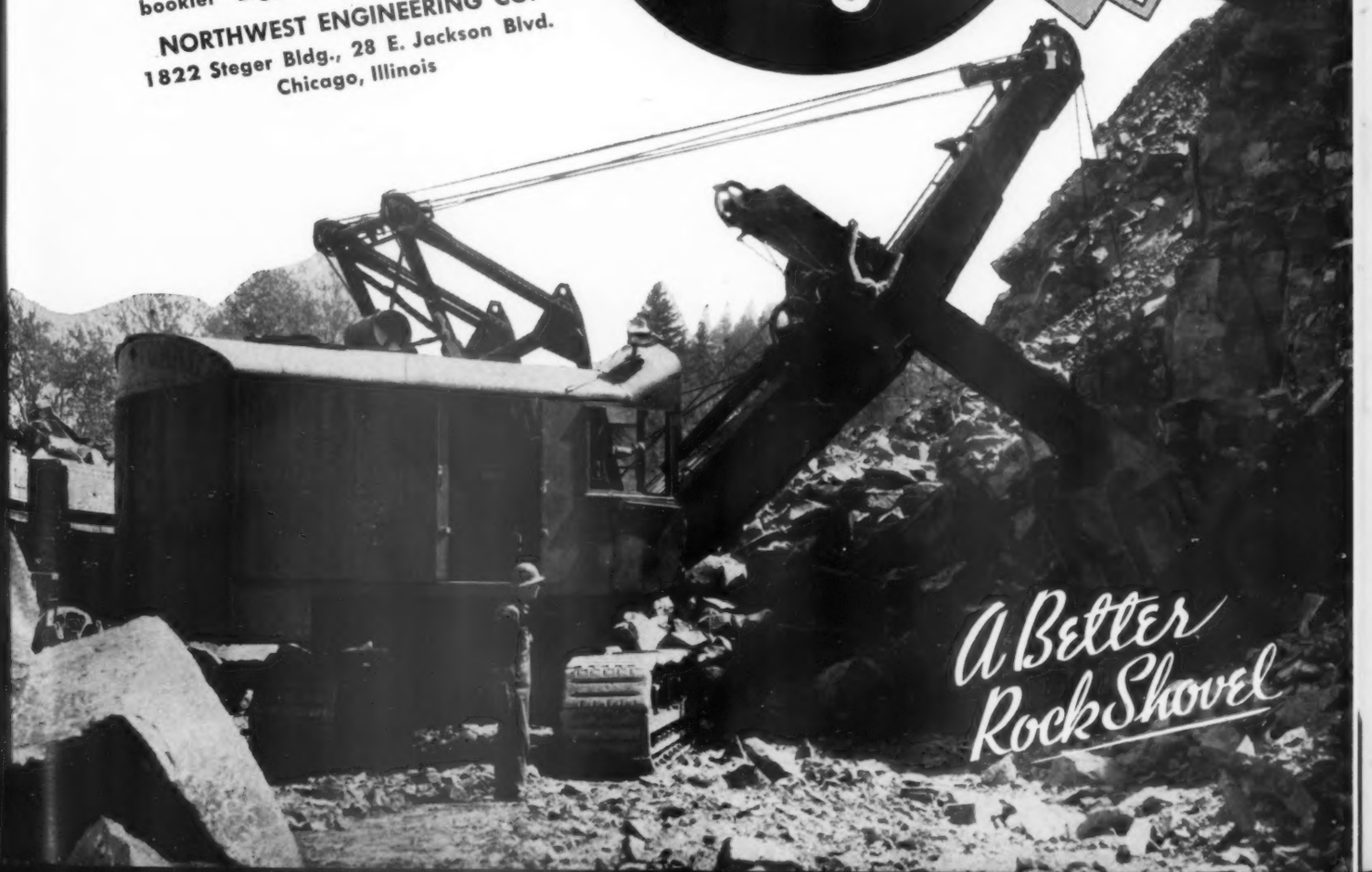
Digging Power Plus

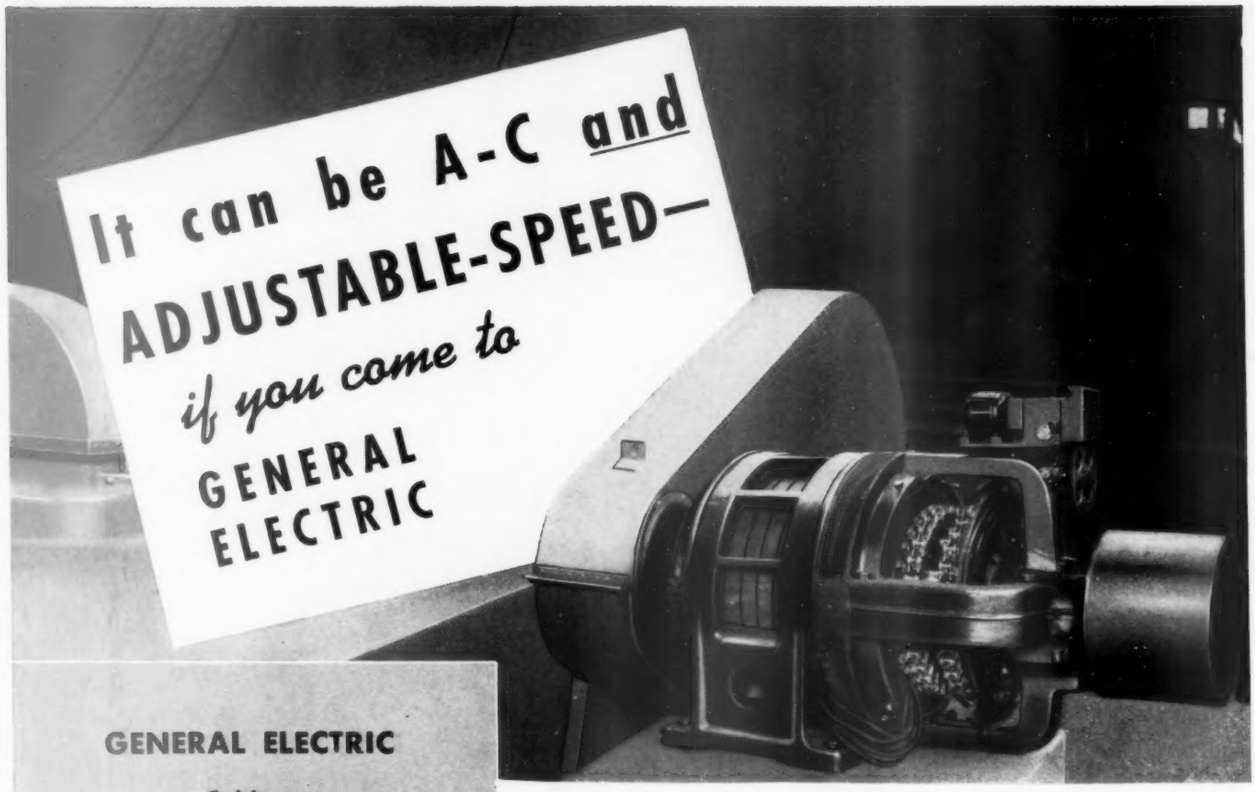
SIMPLE! No chains! No complicated mechanism to get the power to the boom foot. No racks to weaken the sticks. No pinion bearings or pinion to wear and jump the rack.

POWERFUL! A combination of the Northwest Independent Crowd plus an additional force for crowding that other shovels waste—a feature that means Digging Power Plus,—and when you are up against real rock—a Dual Crowd that means a powerful bite and a bigger pay load!

When you buy a shovel ask for the Dual Crowd and the crowding force that other shovels waste. Let us send you our booklet "Digging Power Plus."

NORTHWEST ENGINEERING CO.
1822 Steger Bldg., 28 E. Jackson Blvd.
Chicago, Illinois





GENERAL ELECTRIC

Offers

NOT ONE—NOT TWO—

BUT SIX

Dependable Kiln Drives That Meet All Modernization Requirements

1. **Direct-current with adjustable-voltage control**
2. **Direct-current with field control**
3. **Adjustable-speed, a-c (Type BTA)**
4. **Wound-rotor (slip-ring)**
5. **Squirrel-cage induction**
6. **Gear-motor (in certain sizes any type of motor can be used)**

When you want an a-c kiln drive—with adjustable speed—remember that you can get it in our BTA motor, the only drive built for this service.

It has d-c shunt-motor characteristics. It has a range of dependable speed adjustment of three to one. Changes in kiln load will not cause it to speed up or slow down appreciably.

A recent installation in a large cement plant is demonstrating these advantages. It is also showing the adaptability of BTA drive to operation at any preset speed, obtained automatically merely by pushing the "Start" button.

With six different types of kiln drive available, General Electric is in a position to furnish a drive that will meet any set of operating requirements. Why not have our experienced application engineers go over your plans and make recommendations? Just get in touch with the G-E representative nearest you. General Electric, Schenectady, N. Y.

GENERAL ELECTRIC

652-4

PIT AND QUARRY

Vol. 33 DECEMBER, 1940 No. 6

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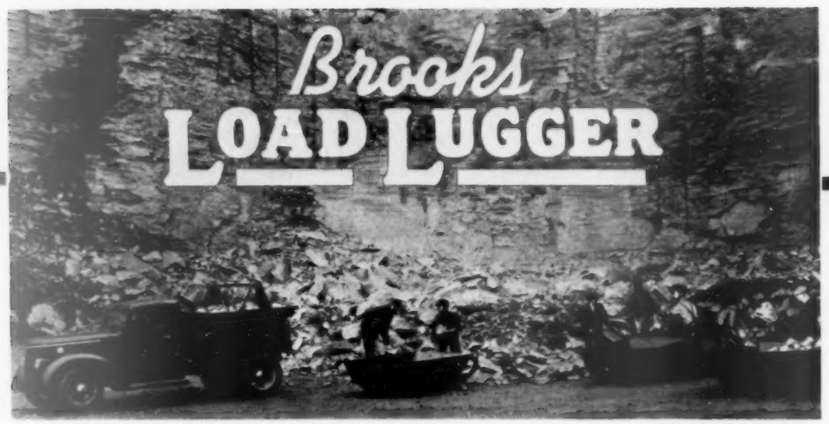


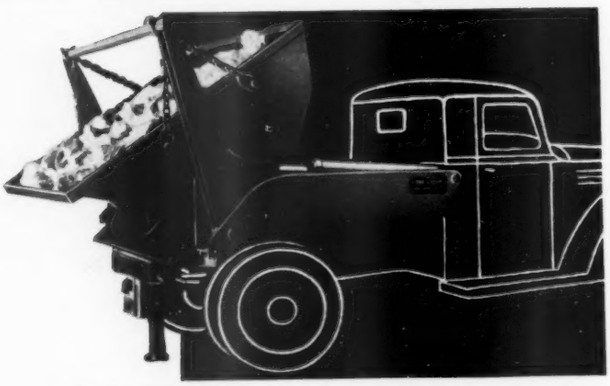
NOTE—

Our Special Introductory Trial Offer enables you to test the Load Lugger on the job. Ask us about it.

Super Features That Save Time and Money

Consider these advantages when you buy dump truck equipment . . . the LOAD LUGGER combines them all:—

- **Modern Streamlined Design**—Simple and compact, requiring only six feet of the truck frame for mounting.
- **Extra Sturdy Construction** — Side frame, deck plate and heavy bumper apron, all welded into a single, rigid unit.
- **High Speed Operation** — Powerful, double hoist. Only about 15 seconds required for picking up bucket or dumping load.
- **LowHeadroom**—Minimum height from tip of boom to ground for easy passage under low bridges.
- **High Discharge**—Dumping hook trips bucket at apron height, allowing easy spreading of material, or spotting load as desired.



NO STRAIN ON TRUCK FRAME

Unique jackleg automatically sets itself at ground level when loaded bucket is lifted, relieving strain from truck and making counterweights unnecessary.

ONE-PIECE WELDED BUCKET

Made of heavy steel plates, continuously welded to accurate shape, and reinforced with angle irons. Forged steel knobs for chains. Practically indestructible.

USEFUL WITHOUT BUCKETS

Mounting the Load Lugger on the chassis does not limit the utility of the truck. When buckets are not in use, the clear space on the deck plate provides a smooth platform for carrying lumber or tools or other materials. Four buckets can be nested together on platform for carrying empty.

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PIT AND QUARRY

CHICAGO DECEMBER, 1940

Smoot Company Files Denial on Monopolistic Practice Charges

Fighting a dissolution action sought by the Department of Justice, the Smoot Sand & Gravel Corporation of Washington, D. C., has filed a denial that it is engaged in illegal monopolistic practices.

Earlier, the anti-trust division of the Justice Department filed a civil suit in United States District Court to break up the corporation. In its reply, the Smoot firm petitioned the court to dismiss the complaint. Trial is many months off.

The government contends the Smoot company has a "strangle-hold" on the sand-and-gravel end of the building industry in Washington. In answer, the corporation asserts its volume of business is due to the high character and efficiency of the services it provides for its customers.

At all times, the answer said, the Smoot firm's prices "have been substantially lower than prices in other cities on the Atlantic Seaboard."

In the reply, filed by Attorneys Roger J. Whiteford and John J. Wilson, the company conceded that the purchase of the Columbia Sand & Gravel Company eliminated the competition of that concern, but denied that it thereby acquired 90 per cent. of the sand-and-gravel business at the nation's capital.

Since 1931, when that competitor was bought out, the denial recited, many other sand-and-gravel firms were organized at Washington, and some of these have sold their products at a price which the Smoot firm could not reach.

Seek to Limit Taking of Sand from Beaches

The Racine, Wisconsin, common council on October 15 adopted a resolution authorizing Mayor Gleason Morris to appoint a committee of three council members to meet with the Wisconsin Public Service commission in an effort to determine who has jurisdiction over the sand on the Lake Michigan beach in Racine.

The committee was also empowered to ascertain what steps can be taken to "limit or stop altogether" private contractors from taking sand from the beach.

Court actions have been filed under a city ordinance against Joseph Socha and Henry Gloede, Racine excavating contractors who are charged with the removal of sand and gravel from the beach.

Coming Events

January 15-17, 1941—Cincinnati. Annual conventions, National Sand & Gravel Association and National Ready Mixed Concrete Association, Netherland-Plaza Hotel.

January 20-22 1941—Cincinnati. Annual convention, National Crushed Stone Association, Netherland-Plaza Hotel.

January 27-31, 1941—New York. Annual convention, American Road Builders' Association, Pennsylvania Hotel.

February 10-12, 1941—Chicago. Annual conventions, National Concrete Masonry Association, American Concrete Pipe Association and Cast Stone Institute, Hotel Sherman.

February 18-20, 1941—Washington. Annual convention, American Concrete Institute, Mayflower Hotel.

Permanente Acquires Two Ocean Freighters for Bulk Shipments

The Permanente Corporation, producer of Portland cement at Los Altos, California, has purchased the 9,000-ton freighters *Cristobal* and *Ancon* from the Panama Railway Company for a reported consideration of $225,000.

The vessels are to be converted to bulk-cement carriers and it is reported they will be placed in service early next year between the Pacific Coast and the Canal Zone where large defense projects are under construction.

Title to the vessels was taken in the name of the Permanente Steamship Company, a newly-formed subsidiary. A $300,000 contract for conversion of the ships has been awarded the Todd-Seattle Drydocks Company.

Construction Volume Highest Since 1931

The year 1940 has been the largest construction year since 1931, and the largest residential building year since 1929. Dollar volume of construction contracts awarded in the 37 states east of the Rock Mountains, during the first 9 months of this year, increased 5½ per cent. over the corresponding period of 1939, according to F. W. Dodge Corporation. The comparative figures were $2,784,352,000 for the first 9 months of this year and $2,634,802,000 for the first 9 months of 1939.

Missouri Portland Installs 14 Packers

Ten new packing machines have been purchased for installation in the St. Louis plant of the Missouri Portland Cement Company and four similar machines will go into service shortly at the company's Kansas City plant.

All 14 of the machines are being supplied by the Modern Valve Bag Company of Allentown, Pennsylvania.

Industrial Leaders of Nation Discuss Health Topics at Conference

More than 200 physicians, surgeons and industrial executives attended the first American Conference on Industrial Health on November 14 at Chicago. The all-day gathering was held in the Chicago Towers Club. The program, sponsored by the American Association of Industrial Physicians and Surgeons, was in the nature of a symposium on the practical value and application of industrial-health work.

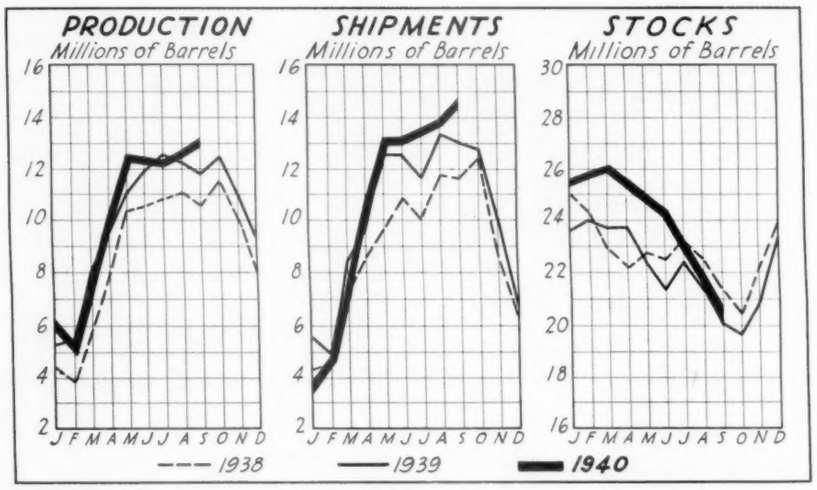
Each speaker, and there were 15, spoke on the general subject as seen from the specific viewpoint of his particular field of endeavor. For example, B. C. Heacock, president of the Caterpillar Tractor Company and one of the nation's best known industrialists and employers of labor, talked from the viewpoint of the employer. Matthew Woll, a vice-president of the American Federation of Labor, presented labor's point of view on the maintenance of the worker's health. Dr. LeRoy U. Gardner of the Saranac Laboratory, Saranac Lake, New York, reviewed some of the research that has been carried on. Other speakers who had a prominent place in the conference were: Dr. William A. Sawyer, medical director of the Eastman Kodak Company; F. A. Lauerman, safety director of the Republic Steel Corporation; Ralph L. Lee, director of public relations for the General Motors Corporation; and Dr. Lydia Giberson, psychiatrist with the Metropolitan Life Insurance Company.

The luncheon session was presided over by Dr. C. O. Sappington, well-known industrial hygienist of Chicago and an occasional contributor to PIT AND QUARRY on the broad subject of industrial disease. At this session Dr. Paul A. Neal, chief of the division of industrial hygiene of the United States Public Health Service forecast the part industrial health will play in the effective working of the national defense program.

The dinner session was featured by an address on *Industrial Health and the General Practitioner* by Dr. Morris Fishbein, editor of the *Journal* of the American Medical Association.

Defense Building May Reach Two Billions

Defense activity will require new construction aggregating between $1,000,000,000 and $2,000,000,000, Clyde G. Conley, president of the American Institute of Steel Construction, predicts.



The Portland-cement industry in September, 1940, produced 13,123,000 barrels, shipped 14,760,000 barrels from the mills, and had in stock at the end of the month 19,913,000 barrels of cement, according to the Bureau of Mines. Production and shipments in September, 1940, showed increases of 10.0 and 12.6 per cent., respectively, as compared with September, 1939. Portland-cement stocks at mills were 12.2 per cent. lower than a year ago. The total production for the nine months ending September 30, 1940, amounts to 92,531,000 barrels, compared with 88,739,000 barrels in the same period of 1939, and the total shipments for the nine months ending September 30, 1940, amounts to 96,070,000 barrels compared with 92,530,000 barrels in the same period of 1939.

Cement Company Earnings

Lone Star Cement Corporation reports for the quarter ended September 30, 1940, consolidated net profit of $916,473 or 95 cents a share, against $967,201 or $1 a share in the September quarter of 1939 and $818,055 or 85 cents a share in the June quarter of 1940. For the nine months ended September 30, net profit was $2,288,083 or $2.37 a share, against $2,476,920 or $2.57 a share in the 1939 period.

* * *

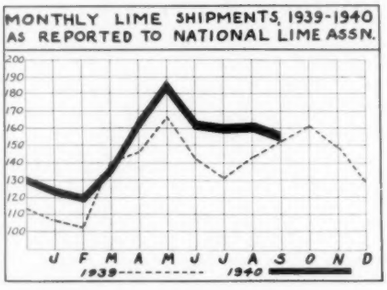
Lehigh Portland Cement Company reports for the 12 months ended September 30, 1940, net profit of $2,011,556, equal, after deducting dividends paid on 4-per cent. convertible preferred, to $2.38 a common share. This compares with $2,062.255 or $2.43 a common share for the 12 months ended September 30, 1939.

* * *

Pennsylvania-Dixie Cement Corporation and subsidiaries report for the 12 months ended September 30 profit of $650,117 after depreciation, depletion, interest, etc., but before Federal income taxes, against profit of $355,011 for the 12 months ended September 30, 1939.

* * *

North American Cement Corporation reports for the 12 months ended September 30, 1940, net loss of $415,664 after taxes, depreciation, depletion and interest, but before profit on bonds purchased, against net loss of $439,875 for the 12 months ended September 30, 1939.



According to data collected by the National Lime Association, 72 companies in September, 1940, shipped 152,417 tons (96,349 quicklime; 56,068 hydrate). Reporting companies represent 51.8 per cent. of the association's total capacity of record. Based on PIT AND QUARRY'S estimates for the remainder of the industry the total shipments for the month are estimated to have been approximately 295,000 tons. Shipments of lime by use and grade for September, 1940, were:

Use	Quicklime (tons)	Hydrate (tons)
Agricultural	3,397	8,856
Building	17,719	30,210
Chemical	75,233	17,002
Total	96,349	56,068

EMPLOYMENT AND PAY-ROLLS
(Compiled for PIT AND QUARRY by Isador Lubin, Commissioner of Labor Statistics, U. S. Dept. of Labor.)

Industry	Establishments	Number of Employees	Pay Rolls (1 week)
Cement:			
August, 1940	132	21,557	$600,393
September, 1940	132	21,739	634,304
		+0.8	+5.6
Quarrying and nonmetallic mining:			
August, 1940	865	30,498	$711,495
September, 1940	865	30,802	733,871
Percentage change		+1.0	+3.1

Directors of National Industrial Sand Assn. Meet in Cleveland

An unusually large attendance featured the semi-annual meeting of the board of directors of the National Industrial Sand Association at the Hotel Statler in Cleveland, Tuesday, November 12, denoting heightened interest in the extraordinary problems confronting the trade to-day.

L. M. Hansen, president, was in the chair, and with the able assistance of V. P. Ahearn, executive secretary, and Stanton Walker, director of engineering, practically every situation was discussed in detail and many suggestions made to obviate difficulties in the prevailing emergency.

A special committee was chosen to deal with industrial and transportation priorities and representations will be made at Washington to preclude disturbing regulations. A car shortage is already apparent, though the end of lake coal shipping for the season will ease this situation, it was said.

With reference to a request from the economic staff of the National Defense Advisory Committee on production possibilities, the consensus was that this information should be freely provided and the government informed that there is an unlimited capacity for production of glass, foundry and abrasive sands. Fear was expressed, however, that transportation might present a "bottle-neck."

The Selective Service Act and its relation to general policy came in for spirited debate and the opinion was expressed that complete coöperation should be given the government and the spirit as well as the letter of the law carried out with reference to reëmployment of the drafted men.

A technical discussion followed a report by Stanton Walker on activities of the association's Foundry Sand Committee and it was stated that a paper would be prepared for presentation before the American Foundrymen's Association on Tests of Foundry Sands. Considerable stress was laid on the need of practical tests. George Pettinos, Jr., was confirmed as a new member of the committee.

Silicosis come in for its usual mention, but the significant thing was that it is rapidly retreating as a threat and the fight against the disease is being held up as an example of what can be done in other directions.

Progress reports were made on the status of the New York foundry and ceramics codes and it was intimated that the coming meetings of the state legislatures would see much legislation attempted on compensation for occupational diseases.

Hot Springs, Virginia, was chosen for the 1941 annual convention, the date to be decided by questionnaire, although it is certain that May or June will be the month.

Those in attendance included the following: L. M. Hansen, president, Industrial Silica Corporation, Youngstown, Ohio; V. P. Ahearn, executive secretary, and Stanton Walker, director of Engineering, Washington, D. C.; William J. Muhlitner and Jorhn D. Cronenurth, Great Lakes Foundry Sand Company, Detroit; Fred R. Sargent, Bridgeport Core Sand Company, Saginaw, Michigan; George A. Thornton, Ottawa Silica Company, Ottawa, Illinois; Ralph Stevens, Cape May Sand Company, Cape May, New Jersey; Hamilton Allport, Standard Silica Corporation, Chicago; A. Warsaw, Wedron Silica Company, Chicago; E. M. Ayers, Ayers Mineral Company, Zanesville, Ohio; E. J. Beyer, Michigan Silica Company, Rockwood, Michigan; William J. Woods, Pennsylvania Glass Sand Corporation, Lewiston, Pennsylvania; J. M. Strouss, Deckers Creek Sand Company, Morgantown, West Virginia; E. Schneider, Ottawa Silica Company, Ottawa, Illinois; R. G. Hay, Ayers Mineral Company, Zanesville, Ohio; Sterling Farmer and A. N. Farmer, Sand Products Corporation, Cleveland; O. W. Lange, Producers Core Sand Company, Michigan City, Indiana; J. S. Cone, Minnesota Mining & Manufacturing Company, St. Paul; F. L. Moore, Peerless Mineral Products Company, Conneaut, Ohio; F. P. Langschwager, Bridgeport Core Sand Company, Saginaw, Michigan; J. W. Whitehead, Whitehead Brothers Company, New York; C. Mathiesen, Whitehead Brothers Company, Albany, New York; C. M. Hardy, T. H. Hardy and Harry Hardy, Houghland & Hardy, Evansville, Indiana; D. R. Egbert, PIT AND QUARRY, and Bror Nordberg, *Rock Products*.

The Atwood-Davis Sand Company and the Illinois-Wisconsin Concrete Pipe Company, which have formerly operated as separate businesses, but under the same ownership, have now established headquarters at South Beloit, Illinois, under the name of the Illinois-Wisconsin Concrete Pipe Company.

RECENT GOVERNMENT CONTRACTS FOR MATERIALS UNDER THE PUBLIC CONTRACTS (WALSH-HEALY) ACT[1]

Date of Delivery 1940	Supplier	Government Agency	Commodity	Amount
8/31/41	National Mortar & Supply Co., Pittsburgh, Pa.	Agric., P. S. & T.	Pulv. limestone	Indefinite
8/31/41	New Castle Lime & Stone Co., New Castle, Pa.	Agric., P. S. & T.	Pulv. limestone	Indefinite
8/31/41	New Enterprise Stone & Lime Co., New Enterprise, Pa.	Agric., P. S. & T.	Pulv. limestone	Indefinite
8/31/41	The Pine Creek Lime & Stone Co., Jersey Shore, Pa.	Agric., P. S. & T.	Burned lime	Indefinite
8/31/41	C. Wilbert Reeder, Muncy, Pa.	Agric., P. S. & T.	Burned lime	Indefinite
8/31/41	C. K. Reisinger, Ickesburg, Pa.	Agric., P. S. & T.	Burned lime	Indefinite
8/31/41	Springhill Pulverized Limestone Co., Uniontown, Pa.	Agric., P. S. & T.	Pulv. limestone	Indefinite
8/31/41	Tyrone Lime & Stone Co., Tyrone, Pa.	Agric., P. S. & T.	Pulv. limestone	Indefinite
8/31/41	United Quarries, Inc., Winfield, Pa.	Agric., P. S. & T.	Pulv. limestone	Indefinite
8/31/41	Yoch & Roberts, Black Horse, Pa.	Agric., P. S. & T.	Pulv. limestone	Indefinite
8/31/41	York Stone & Supply Co., York, Pa.	Agric., P. S. & T.	Ground limestone	Indefinite
Indef.	Northwestern Portland Cement Co., Seattle, Wash.	Interior, Recl.	Portland cement	$21,246.00
12/3	The Sicilian Asphalt Paving Co., Brooklyn, N. Y.	W. P. A.	Asphaltic concrete	44,102.88
12/31	O'Brien Brothers, Cold Springs, N. Y.	W. P. A.	Aggregates	18,360.00
12/31	New York Trap Rock Corp., Haverstraw, N. Y.	W. P. A.	Crushed stone	10,750.00
12/31	Road Material Corp., West Brighton, N. Y.	W. P. A.	Crushed stone & sand	14,245.00
Indef.	Oregon Portland Cement Co., Portland, Ore.	Interior, Recl.	Portland cement	13,000.00
11/14	Hume Pipe Co., Swampscott, Mass.	Boston Navy Yd.	Concrete pipe	17,550.00
Indef.	Lee Lambert, Maryville, Tenn.	T. V. A.	Crushed stone	18,750.00
Indef.	Basalt Rock Co., Inc., Napa, Calif.	War, Engineers	Rip-rap stone	10,250.00
9/30	Dewey Portland Cement Co., Davenport, Iowa Ashgrove Lime & Cement Co., Omaha, Neb. Universal Atlas Cement Co., Hannibal, Mo. Lehigh Portland Cement Co., Mason City, Iowa Northwestern Portland Cement Co., Mason City, Iowa Penn. Dixie Cement Co., Des Moines, Iowa Hawkeye Portland Cement Co., Des Moines, Iowa	Procurement, W. P. A.	Portland cement	62,300.00
12/31	California Portland Cement Co., Los Angeles, Calif.	W. P. A.	Portland cement	Indefinite
12/31	Monolith Portland Cement Co., Monolith, Calif.	W. P. A.	Portland cement	Indefinite
10/4	Southwestern Portland Cement Co., Los Angeles, Calif.	W. P. A.	Portland cement	11,003.70
Indef.	American Bitumuls Co., E. Providence, R. I.	Procurement, W. P. A.	Bituminous concrete	28,552.50
10/31	Monon Stone Co., Monon, Ind.	Procurement, W. P. A.	Aggregates	11,418.84
Indef.	Lock Joint Pipe Co., Ampere, N. J.	Procurement, W. P. A.	Concrete pipe	220,500.00

[1] "Indefinite" refers to indefinite contract; purchases to be made as and when needed.

New Firm to Market Ground Marble as Paint, Rubber Filler

Formation of the White Pigment Corporation, which will manufacture from marble, through a new process, a filler to be used in paint, paper, rubber and linoleum manufacturing has been announced.

Interests of the Vermont Marble Company, of Proctor, Vermont, and Thompson, Weinman & Company of Waltham, Massachusetts, have been combined in the new organization. The Vermont Marble Company has been supplying marble for some time to Thompson, Weinman & Company, which recently equipped a plant at Waltham. The entire machinery of the Waltham plant, it was announced. will eventually be moved to Florence, Vermont, where the marble-grinding plant is being enlarged to double its present capacity to accommodate the new business.

About 80 persons will be employed by the new firm in its production of the by-product. While marble filler has been found an able substitute for filler types previously used, the new firm claims its process produces a higher quality than heretofore developed.

Believe Smoot Ruling Will Affect Others

Despite the recent warning of the Wage and Hour Division, U. S. Department of Labor, that dredge workers "will not in the ordinary case be regarded as seamen and therefore exempt from the benefits of the wage-and-hour law," it is felt that the ruling in the Smoot case which classified its dredge workers as seamen has established a precedent of some sort.

It is pointed out that the administrator of the law has no power of individual exemptions, that he must give to other sand-and-gravel companies the same treatment accorded the Smoot concern if the operating circumstances are the same or nearly so.

Plant Superintendent Dies of Pistol Wound

Paul Hensley, 38, superintendent of the Arkansas Portland Cement Company plant at Okay, Arkansas, died in an Ada, Oklahoma hospital on November 4 as result of a pistol wound in his head, apparently self-inflicted.

Mr. Hensley, an employe of the Oklahoma Portland Cement Company for 23 years, recently was named head of the Arkansas plant and had returned to Ada to move his family to their new home. Relatives said he was alone at the time of the shooting.

Seeks to Acquire New Plant Site at Buffalo

Declaring he is interested in about five acres of county-owned land near Buffalo, Frederick W. Reinhold, president and treasurer of the Anchor Concrete Products, Inc., is discussing a sale price for the ground with county officials.

The company now operates two plants in Buffalo but plans to consolidate them by erecting a new factory at a cost of $20,000 on the new site being sought. Mr. Reinhold said the new plant would employ about 30 persons at the start and 40 within a short period.

Kickapoo Firm Wins Seasonal Exemption

A finding that the Kickapoo Sand & Gravel Company, Inc., Peru, Indiana, is operating under the same conditions as the northern branch of the sand-and-gravel industry and is entitled to seasonal exemption has been announced by Col. Philip B. Fleming, administrator, wage-and-hour division.

As a result of the ruling, the company may work its employees up to 12 hours a day and 56 hours a week without payment of time and one-half for overtime for 14 weeks in any calendar year.

Launches a Campaign for Better Plastering

As a service to architects, the building public and the plastering industry, the Gypsum Association has launched a campaign for better plastering.

Arch Payne, a practical plasterer and former sales representative, has been engaged to introduce the adoption of plastering ordinances as one step in the program. A recommended plastering ordinance has been prepared which is being submitted to cities of over 20,000 population engaged in the revision of their building codes.

Milwaukee to Use Lake Sand Instead of Silica

The Milwaukee board of purchases voted November 14 to discontinue purchase of special silica sand in favor of lake sand. The former has been purchased for Milwaukee's asphalt plant during the last two years at a cost of from $2.38 to $2.90 a ton, while the latter can be purchased at $1.25 a ton.

Independence Cement Plant Signs Year's Contract with Union

A working agreement has been signed between the Universal Atlas Cement Company's Independence, Kansas plant and the United Cement Lime and Gypsum Workers, local Number 109, which is affiliated with the American Federation of Labor.

The agreement includes a seniority clause, stipulations for a grievance committee and continuance as in the past of one week's vacation with pay for all employees, time and one-half for all work in excess of eight hours in any one day or for all over-time in excess of 40 hours in any one week. The contract covers a period of one year.

The agreement was signed by C. M. Carman, plant superintendent, and Richard P. Scott, assistant superintendent. For the union the signers were William S. Thomas, recording secretary; Walter A. Reeves, president, and Orval Webber, business representative.

Operators Seek Harbor Improvement at Dunkirk

Sand companies are making a determined effort to establish the need for extensive local harbor improvements at Dunkirk, New York, notably dredging of the basin and removal of a pile of rock fringing the channel entrance. Dunkirk harbor is a regular port of call for sand boats.

At a hearing conducted here by the U. S. Engineer's Office, the Sand Products Company of Detroit and the Oneida Lake Sand Company of Cleveland declared the present state of the harbor is not suitable even for small vessels. Both companies ship sand into the port.

Ontario Lime Plant Adds Another Kiln

A third vertical kiln has been added at the lime plant of Gypsum, Lime & Alabastine, Ltd., at Beachville, Ontario.

All three kilns will be fired by gas obtained from a Wood gas producer which also has just been installed. The kilns were formerly fired with natural gas.

Two Portland Concerns Plan Plant on Island

The Portland Sand & Gravel Company and Pacific Building Material Company, both of Portland, Oregon, will erect a sand-and-gravel plant on Pierce Island, according to press reports.

CURRENT BUSINESS INDICATORS

Establishment of a Priorities Board of the Defense Commission was perhaps the outstanding development affecting industry during the past month. This action at once brings to mind the experience of the World War when the necessity for priorities had a profound effect on sand and gravel, stone, and other nonmetals producers. At that time it was largely lack of transportation facilities that virtually tied up the output of aggregates and other bulky products, except those essential to war needs.

For the immediate future at least it is not expected that any drastic action will be necessary. Shortly after its appointment the board announced that a machine-tool priority committee to coordinate national-defense, commercial, and export demands on the machine-tool industry had been established. Of particular significance was the statement that the committee would formulate policies governing operation of a voluntary preference rating system, indicating that the board hopes to cope with situations on a voluntary basis. Nevertheless, it may be expected that mandatory priorities will be forthcoming whenever conditions warrant such action.

The machine-tool committee is composed of representatives of the industry, and the Army, Navy, and Defense Commission. Apparently the procedure to be followed for all industries, where the need for priorities seems imminent, will be to select a "neutral" administrator having experience but no ties with the specific industry, and an advisory committee which to date typically comprises two industrial leaders and an officer from each branch of the service. Although these advisory committees will formulate policies and recommend procedures for their industries, the board may take any independent action.

The clamor from virtually every industry for machine tools is perhaps the result of the outstanding situation that may require detailed action by the Priorities Board. Squeezes may be expected also in raw-materials supplies, manufacturing facilities for all sorts of products, labor supply, and transportation equipment. The potential magnitude of the job the Priorities Board ultimately may be called on to undertake is almost beyond comprehension.

Defense contracts already let total something like 8 billion dollars. Much publicity has been given to the program as a whole and to various specific phases of it, but the first comprehensive summary showing the break-down of all contracts by classifications, geographic regions, and industrial areas was released by the commission on November 18. It includes all contracts let to November 1, 1940, a total of $7,616,650,000. For all classifications only the summary by geographic areas is reproduced here, but full details on construction contracts are given.

Where a concern maintains a central office and has a plant located in some other industrial area, the contract has been assigned to the producing plant but, nevertheless, the break-down rep-

(Continued on page 68)

Distribution of Defense Contracts Awarded by the War and Navy Departments, by Major Objects and Geographical Regions, between June 1 and October 31, 1940

(Preliminary figures, in thousands of dollars)

Geographical Regions	Ship Construction	Other Construction	Airplanes, Engines, etc.	Ordnance and Ammunition	All Other Manufacturing	Totals
New England region	$ 861,268	$ 112,146	$ 134,403	$ 158,833	$ 55,828	$1,322,478
Middle Atlantic region	1,046,641	80,686	217,724	419,519	325,657	2,090,227
North Central region	96,430	91,348	190,149	390,574	245,198	1,013,699
South Central region	116,804	149,258	1,960	52,051	12,582	332,655
South Atlantic region	590,338	170,168	229,918	137,366	43,407	1,171,197
Pacific Mountain region	518,657	126,856	725,337	13,046	12,864	1,396,760
Off continent	720	78,649	.....	.....	124	79,493
Subtotal	$3,230,858	$ 809,111	$1,499,491	$1,171,389	$ 695,660	$7,406,509
Unassigned	934	30,479	2,963	66,556	109,209	210,141
Grand total	$3,231,792	$ 839,590	$1,502,454	$1,237,945	$ 804,869	$7,616,650

Distribution of Defense Construction Contracts Awarded by the War and Navy Departments, by Geographical Regions and Industrial Areas, between June 1 and October 31, 1940

(Preliminary figures, in thousands of dollars)

Geographical Regions and Industrial Areas	Amounts
New England Region	
Bath-Portland (Me.)	$ 2,693
Boston (Mass.)	23,922
Bridgeport-New Haven-Waterbury (Conn.)	24,218
Burlington-Winooski (Vt.)	838
Falmouth (Mass.)	35,450
Hartford (Conn.)	8,200
New London-Groton-Norwich (Conn.)	9,154
Newport (R.I.)	2,907
Portsmouth-Rochester (N.H.)	1,136
Providence (R.I.)-Fall River-New Bedford (Mass.)	21
Springfield-Holyoke (Mass.)	3,579
Waterville-Augusta (Me.)	28
Total	112,146
Middle Atlantic Region	
Albany-Schenectady-Troy (N.Y.)	317
Allentown-Bethlehem (Pa.)	578
Buffalo (N.Y.)	1,023
Dover (N.J.)	910
New York (N.Y.)-Newark-Jersey City (N.J.)	20,057
Philadelphia (Pa.)- Camden (N.J.)	44,712
Trenton (N.J.)	1,124
Watertown (N.Y.)	6,501
York-Lancaster (Pa.)	5,464
Total	80,686
North Central Region	
Chanute Field (Ill.)	3,320
Chicago (Ill.)	19,843
Cincinnati (O.)	556
Cleveland (O.)	14,215
Columbus (O.)	4,107
Davenport (Ia.)-Moline-Rock Island (Ill.)	3,197
Dayton (O.)	1,982
Detroit (Mich.)	20,141
Hillsdale-Battle Creek-Jackson (Mich.)	3,238
Indianapolis (Ind.)	340
Kansas City (Mo. and Kan.)	130
Milwaukee-Racine (Wis.)	175
Minneapolis-St. Paul (Minn.)	3,473
Oshkosh (Wis.)	2,000
St. Louis (Mo.)	1,145
Wichita (Kan.)	4,988
Rest of North Central Region	8,474
Total	91,348
South Central Region	
Alexandria (La.)	4,243
Austin-Waco (Tex.)	533
Birmingham-Anniston (Ala.)	3,463
Brownwood (Tex.)	5,942
Corpus Christi (Tex.)	24,028
Dallas-Ft. Worth (Tex.)	200
El Paso (Tex.)	3,046
Gadsden (Ala.)	1,138
Hattiesburg (Miss.)	9,761
Houston (Tex.)	14,714
Little Rock (Ark.)	4,660
Louisville (Ky.)-Jeffersonville (Ind.)	55,283
Memphis (Tenn.)	2,361
Mobile (Ala.)	2,769
Orange (Tex.)	5,223
San Angelo (Tex.)	547
San Antonio (Tex.)	1,756
Tullahoma (Tenn.)	8,638
Rest of South Central Region	953
Total	149,258
South Atlantic Region	
Anderson (S.C.)	427
Atlanta (Ga.)	10,013
Baltimore-Annapolis (Md.)	11,216
Charleston (S.C.)	1,483
Charleston-Huntington (W. Va.)	4,000
Chattanooga (Tenn.)-Rossville (Ga.)	39
Fort Bragg (N.C.)	3,812
Fort Jackson (S.C.)	5,637
Indianhead (Md.)	1,945
Jacksonville (Fla.)	24,774
Miami-Key West (Fla.)	4,679
Norfolk-Newport News-Portsmouth (Va.)	44,748
Orlando (Fla.)	931
Parris Island (S.C.)	3,641
Pensacola (Fla.)	4,795
Roanoke-Lynchburg (Va.)	10,000
Savannah (Ga.)	4,108
Tampa (Fla.)	2,506
Washington (D.C.)-Alexandria (Va.)	30,628
Wilmington (Del.)	498
Rest of South Atlantic Region	288
Total	170,168
Pacific Mountain Region	
Denver-Pueblo (Colo.)	1,475
Hawthorne (Nev.)	2,200
Los Angeles (Cal.)	26,901
Monterey-Fort Ord (Cal.)	6,214
Portland (Ore.)-Vancouver (Wash.)	1,399
Salt Lake City-Ogden (Utah)	3,671
San Diego (Cal.)	14,390
San Francisco (Cal.)	31,718
Santa Barbara (Cal.)	117
Seattle-Tacoma (Wash.)	37,634
Stockton (Cal.)	765
Rest of Pacific Mountain Region	372
Total	126,856
Off Continent	
Alaska	11,668
Canal Zone	19,564
Hawaii	34,755
Midway Island	1,338
Puerto Rico	11,324
Total	78,649
Subtotal	$809,111
Unassigned	30,479
Grand Total	$839,590

EDITORIAL

A Decade for History

WE ARE rapidly approaching the end of the third decade of this century—a decade that history will record as one of great importance to the human race. Depending on one's point of view and on one's sense of values, it may be regarded in various ways. Those who look upon the ten-year period just coming to an end as the "terrible thirties" are likely to look forward to the next decade as the "fearful forties," for habitual pessimism is a mannerism not easily discarded. To most of these people the present age is the worst, the present generation the least moral, the present trend the most dangerous. These dwellers-in-the-past have lost—if they ever possessed it—the gift of hopeful expectancy, the ability honestly to conceive a kind of living better than the one known to them, to visualize and strive for the attainment of standards of thinking and doing superior to those under which they were reared. Their thinking—if that term can in seriousness be applied to their mental processes—is reversed by their preoccupation with retrospection. Men who habitually look backward find it difficult to look forward; they are definitely against progress; they are idolaters at the temple of *Status Quo;* "their future lies behind them."

To others the decade just closing will appear, despite some of its most hideous events, as one of glorious adventure, a field into which we should have stepped many years ago and into which, indeed, we would have gone but for the clamor of those who cried out for the protection of gains that had been made and against the relinquishment of any of the privileges acquired through economic use and wont. It is a decade in which many of the worth-while things for which men have striven for centuries have, within the short space of a few years, been placed in serious danger. Freedom of action in politics, in economics, in private life has been attacked on so many fronts, it has been destroyed in so many places, that one may well wonder whether freedom of thought itself may not in time be stifled through the lack of opportunity for use that results from ever-increasing application of restrictions and prohibitions. We of this period are witnessing what might be called a cultural throw-back; the revival of outmoded processes of government, an outmoded concept of the function and position of the state, outmoded ideas of social relationships, outmoded standards of right and justice. Large parts of the world have been thrown back into the mental atmosphere of the middle ages when feats of arms and other manifestations of physical prowess delighted not only the minds of simple maidens but those, too, of mature men. The international situation, as characterized by these marks of decadence, is a gloomy picture whose true colors and correct perspectives are not yet visible to all.

There are some spots in this troubled world where the attainments of man's future are definitely indicated. In this great expanse of country, where, until recent years, men could risk the hardships of the pioneer with the certainty of material success, the competition between men has increased in severity as the number of contestants has grown while the number of prizes has not kept pace. Yet we recognize the need for adjustment, for protection of men's right to seek and attain a broader basis for living.

In this land, where, until recent years, men could think of themselves as secure from outside attack and look upon Europe as a place for travel and healing baths, we find ourselves rubbing shoulders with many who find something magnificent in the theory that the principles of liberty and equal opportunity should be battered and destroyed. This has brought to most of us a new sense of interdependence between persons and between peoples.

In this land of still-great and glowing opportunities, where, until recent years, men could selfishly hack out their individual fortunes with little or no regard for the rights of their fellow men, we have come to attach more importance to the general welfare than to individual success, we have acquired a social outlook that was all too rare even in the last two decades. We accept as public and, therefore, government responsibilities the duty of providing sustenance during periods of unemployment, guidance for youth seeking to make its way, care and comfort for the aged and infirm.

FUTURE historians will speak with satisfaction of the social gains made in this decade. They will call its social achievements the greatest of a century. They will applaud the courage of those who, in the face of age-old traditions, advocated changes of great significance even at the risk of incurring suspicion, abuse and social ostracism. They will see this decade and its accomplishments with the advantage of a perspective and a detachment not given to most of us who have lived through it.

They will tell, too, of this decade's brutishness, its misery, its degradation of entire peoples, its destruction of the moral sense among whole nations, its pseudo-scientific preaching of racism as a basis for political mastery, its ruthless use of deception and falsehood, its distortion of scientific truth for base ends, its continued and unjustifiable affronts to clean thinking and clean living. They will have harsh, yet understanding, words for the philosophy of cruel and wanton destruction that stalks across three continents, and for the abject toleration and political *naïveté* of those peoples who allowed themselves to be swept into the intellectual vacuum in which that philosophy took root.

Those of us who have contributed in however small a way to the furtherance of human progress during these ten years may feel a degree of satisfaction that we were alive throughout the period, that we live in one of the few remaining spots where human values are paramount, where the right of men to think as they please, to speak freely and even harshly of men and their acts, to gather for open discussion of their problems, and to write and disseminate their views, however stupid or ill-advised they may be, is still recognized as the greatest attainment of mankind.

PIT AND QUARRY Special Section

PERMANENTE DEPARTS FROM TRADITION IN DESIGN OF NEW CEMENT PLANT

PERMANENTE takes full advantage of FULLER EQUIPMENT

Fuller Rotary Air Compressors installed at Permanente

Fuller-Kinyon Type H Pump, similar to those installed at Permanente

All modern, up-to-date cement plants take full advantage of Fuller cost-saving equipment wherever possible to do so. For example, The Permanente Corporation, Permanente, California, builders of the latest cement plant in the United States, installed the following Fuller-Kinyon equipment:

For conveying—

From mills to separators
Separators to silos
Silos to packers and bulk loading
Flue dust
Gypsum

Also

Rotary valves
Air-cleaning equipment

Also installed in this new plant are six Fuller Rotary Air Compressors, each of which furnishes air to a Fuller-Kinyon Pump.

FULLER COMPANY
CATASAUQUA, PENNSYLVANIA

Chicago: 1118 Marquette Bldg.
San Francisco: 320-321 Chancery Bldg.

FULLER

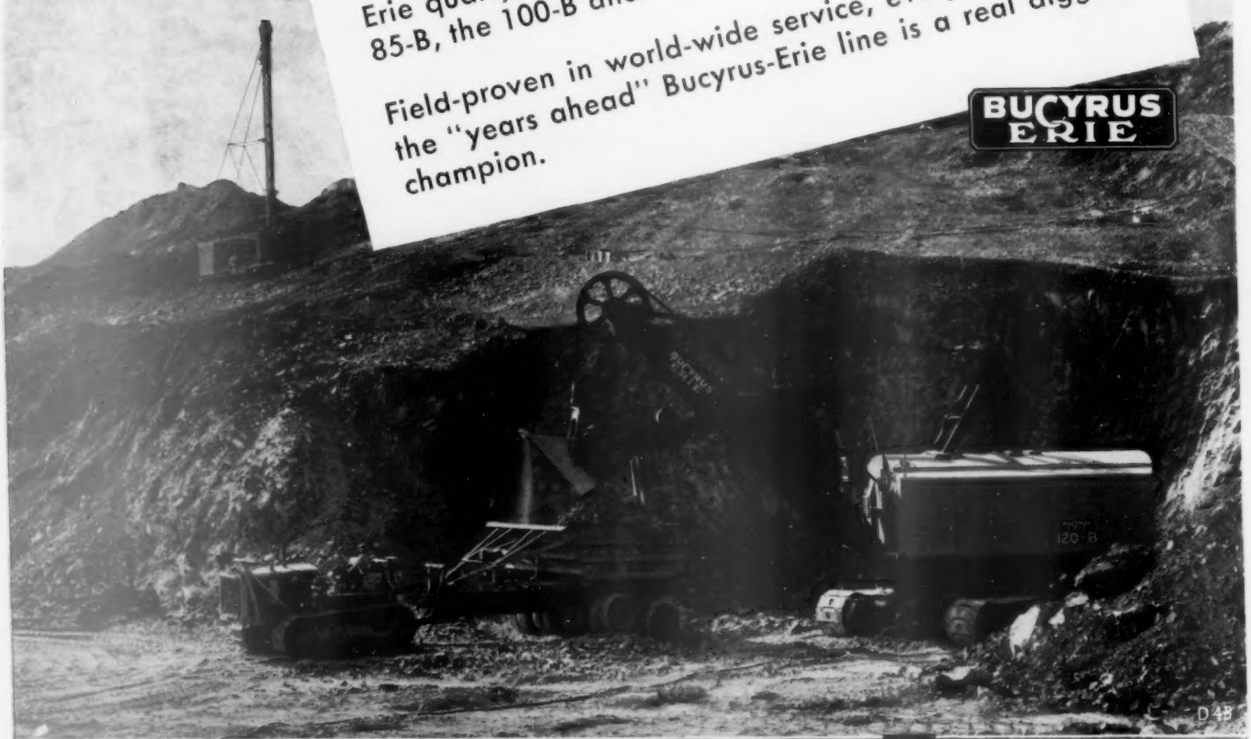
GETTING OUT THE ROCK FOR PERMANENTE

AT Permanente Corporation's big California plant, Bucyrus-Erie equipment is keeping costs down and production up as in most modern quarries all over the world. Drilling is handled by a Bucyrus-Erie 29-T which puts down economical 9-inch holes. Rock is loaded out by a fast, modern 120-B shovel.

Sturdy all-steel Bucyrus-Erie drills with rubber shock absorbers deliver a snappy shattering blow that really eats into the rock. Sizes are available to put down hole to 12 inches in diameter. In addition to the world-famous 120-B, the line of modern heavy duty Bucyrus-Erie quarry and mining shovels includes the 54-B, the 85-B, the 100-B and the 170-B.

Field-proven in world-wide service, every machine in the "years ahead" Bucyrus-Erie line is a real digging champion.

BUCYRUS ERIE



Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN

PERMANENTE...Newest Name in the American Cement Industry

THE new plant of the Permanente Corporation near Los Altos, California, continues to be the biggest news in the cement industry. Built primarily to supply 5,800,000 barrels of low-heat cement for Shasta Dam, construction records were broken in getting this plant into operation. To date over 1,500,000 barrels of cement has been produced for this contract, for other Federal work, for states, municipalities, and for other users in direct competition with other manufacturers. Recently two 10,500-ton steamers were purchased with the intention of reaching export markets in South and Central America, Pacific islands, Alaska and other offshore points.

The contract for the Shasta Dam cement was awarded to the corporation by the United States Bureau of Reclamation of June 10, 1939. On June 28 ground was broken and on December 25 the first barrel of cement was produced. Well ahead of the March 15, 1940, contract date, the plant was in a position to meet all the demands for the dam. Actually delays in the dam construction held up cement shipments until May 14. The first cement was shipped from the plant to other points on January 31. It was sacked in a temporary pack-house pending the completion on March 20 of the permanent building now in use.

The plant was originally designed to produce daily 7,000 barrels of low-heat cement and easily exceeded this figure. Growing demands for cement from other sources soon made it necessary further to increase the capacity and a third kiln was installed. This, with its accompanying grinding equipment, went into operation in September of this year. The plant now is able to produce considerably more than its rated capacity of 10,500 barrels of low-heat cement. Along with the cement producing facilities a rotary-kiln lime plant, a sugar-rock plant and a commercial crushed-stone plant are also operated. Production of sugar rock was begun in September, 1939, of lime in February, and of crushed stone in March, 1940.

The deposit, which had once been used for small-scale sugar-rock production, lay idle for many years until it was brought to the attention of Mr. Kaiser. The calcium-carbonate content of the quarry-run rock averages about

Some of the storage piles with secondary-crusher house in the center.

Shovel loading one of the tractor-drawn buggies.

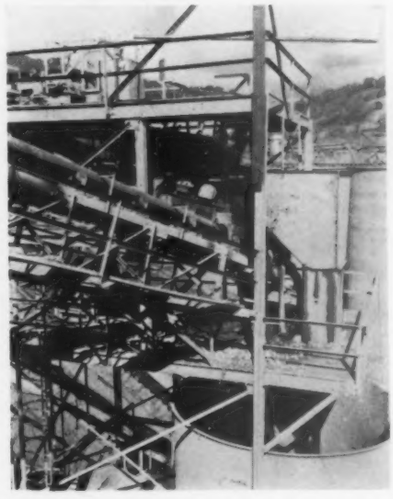
Discharging a load of rock into hopper serving primary crusher and screen. A portion of the belt-conveyor which starts the stone on its long haul is seen at the left.

By W. E. TRAUFFER

Aërial view of the Permanente operations. The lime plant is in the depressed section in the foreground.

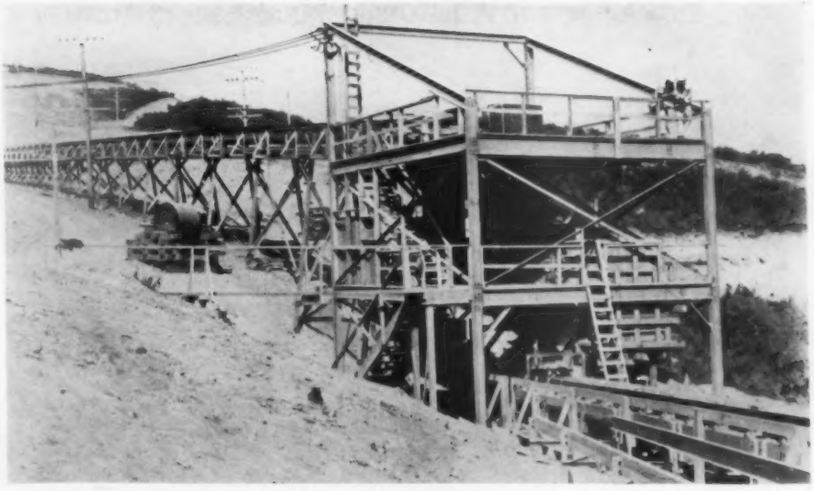
85 per cent., with large blocks of rock analyzing over 98 per cent. About 35,000,000 tons of rock has been staked out and core drilled, and it is estimated that there is at least 300,000,000 tons in the deposit.

Because of the high silica content in certain sections of the quarry and occasional intrusions of chert, however, this deposit was not considered suitable for cement manufacture until the Breerwood system of flotation was perfected. This system, which is controlled by the Separation Process Company, was installed as an integral part of the plant. It is used whenever the nature of the raw material requires its use and at other times stands ready to operate as an insurance and guarantee of the quality and uniformity of the finished cement. Even when not needed the flotation system is operated periodically as a check on other operations.



Screen used to wash sugar rock with conveyor and loading bin.

Part of the field-conveyor system. Note truss in foreground supporting 4,200-pound concrete counterweight.



Point in the belt-conveyor system where the stone is divided for sugar-rock and cement processing.

When the system is used, its primary function is to reduce the silica content and raise the calcium-carbonate content of the raw material. Sometimes it is required to process the entire raw-mill output of over 140 tons per hour, while at other times only a part of the raw material needs to be processed. According to company officials, the flotation system has proved itself capable of meeting any conditions which might arise and does whatever is required of it economically and efficiently. Any type of cement except white can be made through the use of this system. Among the types which have already been made are low-heat, high-early-strength, standard, modified, moderate-heat, sulphate-resisting, oil-well and modified construction. The more uniform control of the raw mix has also resulted in better burning conditions and lower fuel consumption. Use of the system also makes possible straight instead of selective quarrying.

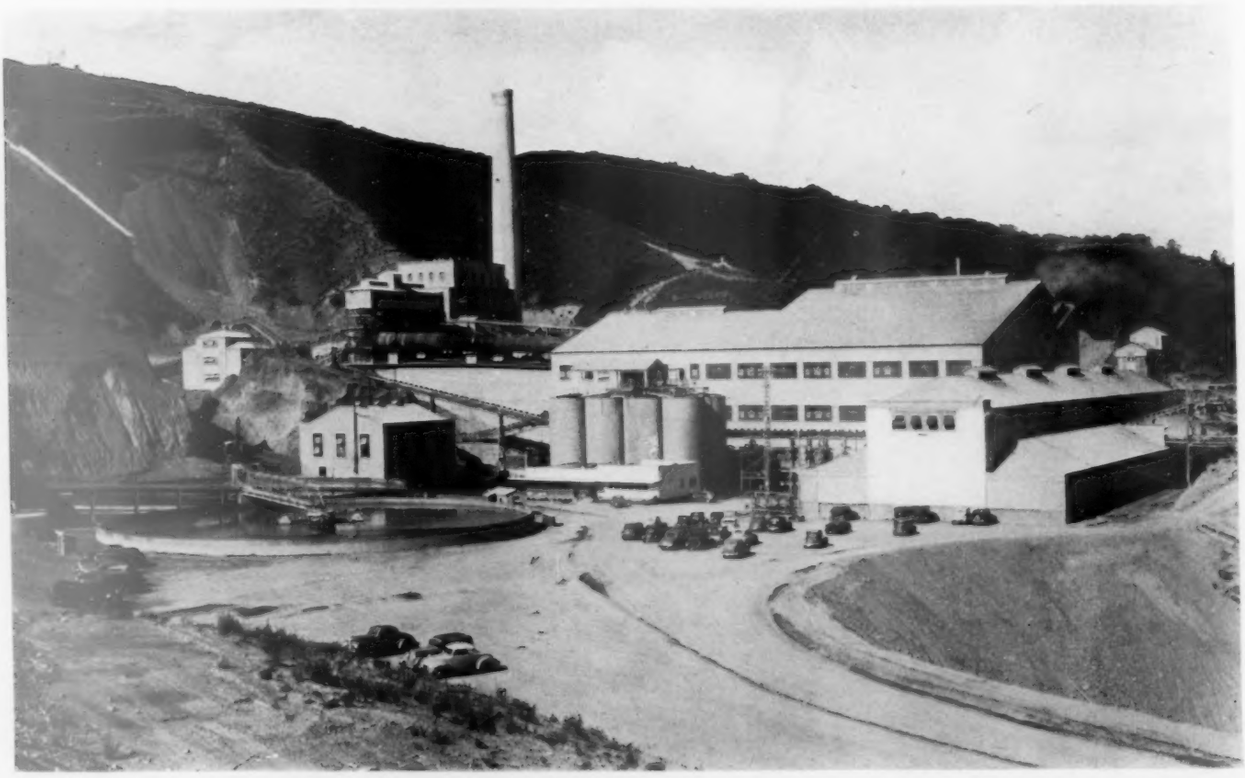
One of the most important factors contributing to the efficient and low-cost production of cement and other products in this plant is the utilization of all the raw material in these products with the least waste and handling. Lime is made from the breakage of the sugar rock, cement from the undersize and oversize of the sugar rock and crushed stone from sugar rock or cement-rock waste.

The topography has been used to full advantage in the handling and storage of raw materials. Conveyors from the quarry run down-hill to the stock-piles, regenerating about 350 horsepower which is thrown back into the power system. All the stock-piles and the clinker storage are in natural ravines, giving them a high percentage of live storage capacity. Reclaiming is done through tunnel belt-conveyors.

The mechanical lay-out of the plant has made possible great flexibility in chemical control. Evidence of this is the fact that, in its comparatively short history, the plant has successfully produced seven different compositions and types of cement. Of these, the sulphate-resisting and Shasta low-heat cements, to be successfully and economically produced, must be held within very narrow composition limits.

Part of the conveying system which brings stone from the quarry at upper-left in the distance.

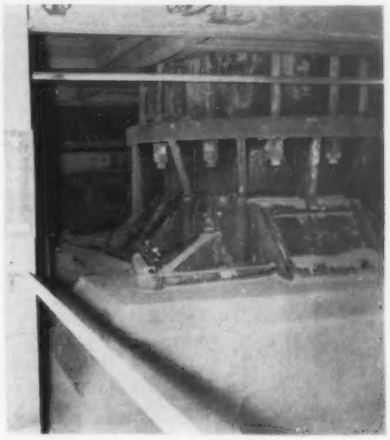
Siliceous clays of several different compositions are available on the property and the separate wet grinding of



The upper view shows the shovels, tractors, scrapers and other equipment at work leveling the site for the Permanente plant. The lower view, photographed from approximately the same position in relation to the hills in the background, shows the plant as it appears to-day.

the clay and limestone before blending makes accurate and uniform slurry composition possible. If desired, slurry for two different types of cement can be blended at one time.

The unusual clinker storage and reclaiming system makes it possible to store several types of clinker without danger of contamination or deterioration from any cause. Through the use of accurate feeders it is possible to blend two or more types of clinker to make any number of intermediate types. The arrangement of the finish-grinding department makes it possible to grind three types of cement at one time. At the time of the writer's visit to the plant Shasta low-heat and oil-well cements were being produced simultaneously. The use of pneumatic conveying systems to feed from the finish mills to the separators is also noteworthy.



Crusher which reduces oversize cement rock.

General view showing primary jaw crusher and conveyors from tunnel and to plant.

Another general view of the Permanente plant.

Not only the cement plant has exceeded the capacity for which it was designed, but the other plants, too, have shown higher capacities. The lime plant produces 100 tons of lime daily. The crushed-stone plant can produce any desired sizes from stone sand up to ballast. On average materials it can produce 200 tons per hour with its usual feed of 4-inch minus rock. The sugar-rock plant output is about 600 tons in 8 hours.

In the cement plant the raw-grinding department has exceeded its rated capacity of 150 tons per hour grinding ⅜-inch minus rock to a fineness of 95 per cent. through 200-mesh. The finish-grinding department also exceeds its rated capacity of 500 barrels of low-heat cement per hour, grinding to a surface area of 1,800 square centimeters per gram.

Those connected with the design and construction of this plant have every right to be proud of the results, especially when it is realized that cement was produced six months after the ground was broken, and that plant details were designed as the construction progressed. Those responsible for the general design of the plant are: Harry P. Davis, general superintendent; Fred Crocker, chief designing engineer; F. R. Greyson, mechanical engineer; and W. C. Stevenson, consulting engineer. George Scheer was consulting engineer in the electrical work, Professor Raymond Davis of the University of California is consultant on cement manufacture, and Dr. L. H. Duschal of the same university is consultant on dust problems. The Separation Process Corporation and major equipment manufacturers had men on the job in an advisory capacity.

The officers of the Permanente Corporation are Henry J. Kaiser, president; E. E. Trefethen, Jr., vice-president; Charles Shea, treasurer; Henry J. Kaiser, Jr., secretary and project manager. Carl M. Price is chief chemist. Von Scott is quarry and conveyor superintendent and A. J. Anderson is mill superintendent.

Quarrying, Transportation and Raw Storage The nature of the deposit is one of the most important factors contributing to the low cost of the stone delivered at the plant. It is so highly fractured that drilling and blasting are seldom necessary and then only on a very small scale. The following screen analysis of a 10,881-pound sample of uncrushed and unscreened quarry rock illustrates this point:

Size		Pounds	Percentage
Retained on 6	-inch	1,359	12.5
Retained on 5	-inch	517	4.8
Retained on 4	-inch	917	8.4
Retained on 3	-inch	1,259	11.6
Retained on 2.5	-inch	1,108	10.2
Retained on 2	-inch	868.5	8.0
Retained on 1.5	-inch	970	8.9
Retained on 0.5	-inch	2,038.5	18.7
Through Retained on 0.5	-inch	1,843.5	16.9

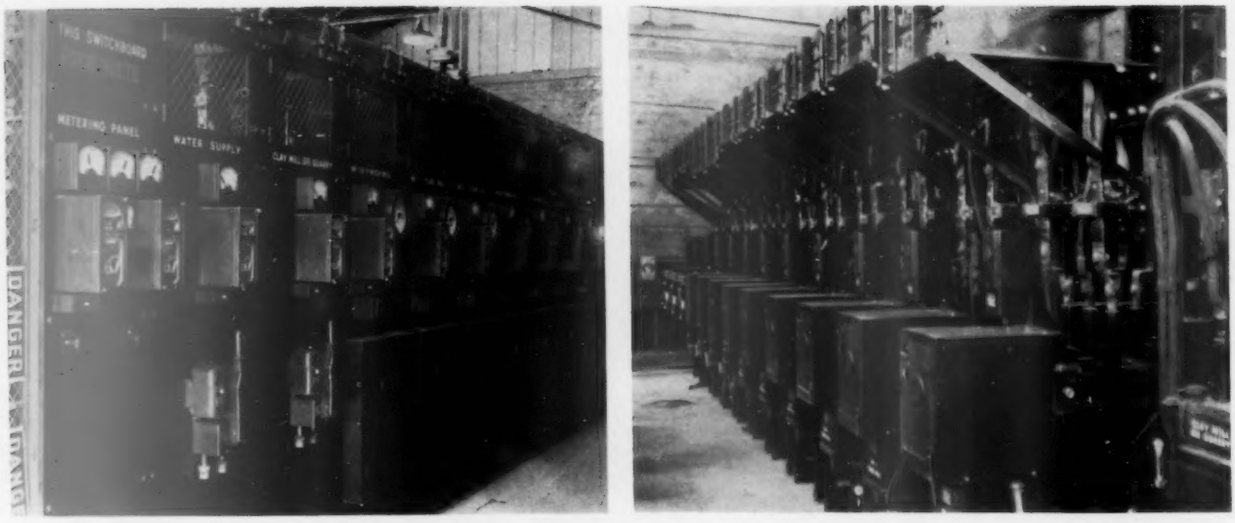
A typical analysis follows:

SiO_2	12.00 per cent.
Fe_2O_3	1.03 per cent.
Al_2O_3	1.10 per cent.
$CaCO_3$	85.75 per cent.
$MgCO_3$	0.12 per cent.

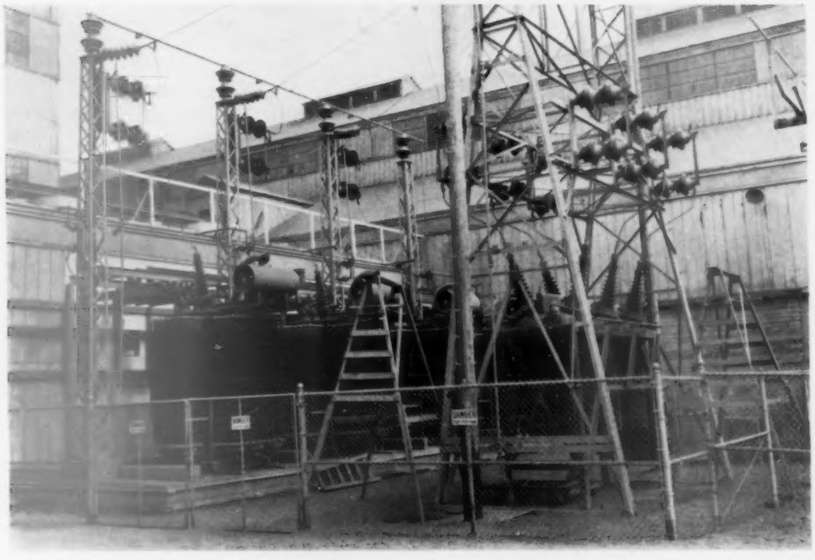
Little stripping of overburden is necessary.

The quarry is being developed on two 50-foot levels, working one at a time. Loading is done by a Bucyrus-Erie 120-B electric shovel with a 5-cubic yard dipper.

When opening the quarry two Le Tourneau 30-cubic yard pneumatic-tired 16-wheeled buggies were used. These were hauled by Caterpillar and Cleveland tractors to the hopper at the edge of the quarry. Later a conveyor system was installed. The shovel loaded the stone into a hopper over a 36-inch by 100-foot pendulum conveyor fed by a Jeffrey-Traylor vibrating feeder. This conveyor discharged the



Front and rear views of the 2,300-volt switchboard.

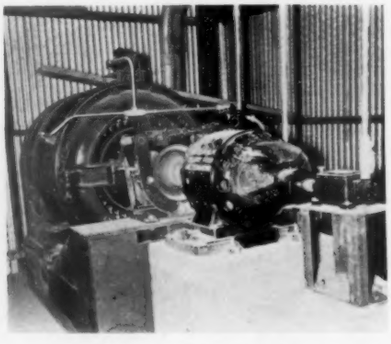


Transformers and main circuit-breakers at outdoor sub-station.

Looking down on the flotation plant. Slurry-blending tanks, mill building and clinker-storage structure at rear.

Bank of exciters for the 500- and 1,000-horse-power mill-drive synchronous motors.

Control board for the No. 1 and No. 2 kilns.



Motor drive of the No. 3 kiln with slurry-feed alternator.

stone on a lateral conveyor which could be extended up to 1,000 feet in length. This, in turn, fed a field conveyor which could also be extended to any desired length. The field conveyor discharged the stone on a surge stock-pile of 5,000 tons live storage capacity in the quarry. Stone is withdrawn by a 42-inch Link-Belt pan-feeder on a 42-inch by 400-foot belt-conveyor in a tunnel under the stock-pile. A Merrick Weightometer on this conveyor records the amount of stone going to the plant and also automatically controls the feeder gate to insure an even rate of feed. This conveyor feeds the main hopper at the head of the main conveyor to the plant.

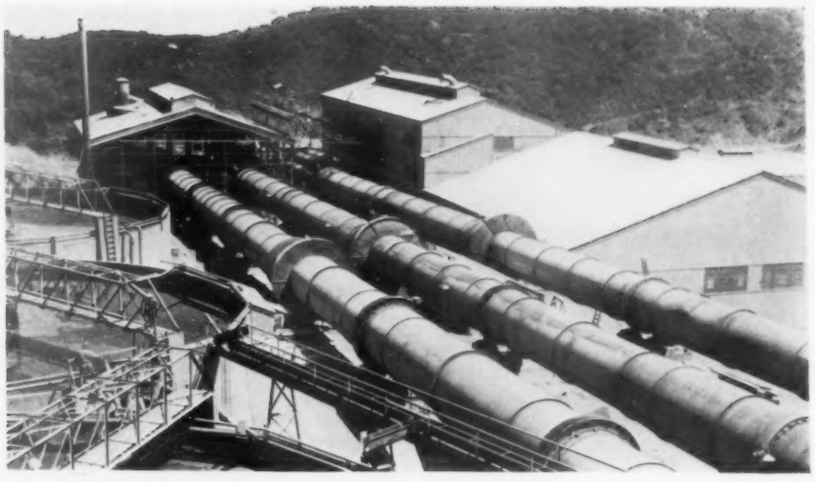
Short-head cone-crusher used for final reduction of stone destined for the crushed-stone and lime plants.

A view showing the stack, precipitator building and pipes from kilns.

At present the Le Tourneau buggies are again being used, feeding both to the main hopper and a hopper over one of the conveyors in the quarry.

Under the main hopper is a 5- by 10-foot Tyler Ty-Rock 1-deck screen with 6-inch openings. The oversize material goes into a 24- by 36-inch Farrel-Bacon jaw crusher, which is driven by a 100-horsepower motor. The "throughs" from the screen drop on the first of the series of 36-inch belt-conveyors running to the plant and break the shock of the crusher product dropping on it.

The three conveyors in this series—*A*, *B* and *C**—are respectively 1,630, 2,225, and 1,300 feet long. Beginning at 1,630 feet above sea-level, each conveyor has a drop of 165 feet. Each is driven by a 200-horsepower, synchronous regenerative motor at its feed end. Under full load these motors regenerate a total of 350-horsepower which is thrown back into the system. Goodyear 8-ply, 42-ounce conveyor belting is used and 4½-foot diameter pulleys help to insure long life. These conveyors are mounted on wooden bents resting on precast concrete blocks with special termite-proof steel caps between the



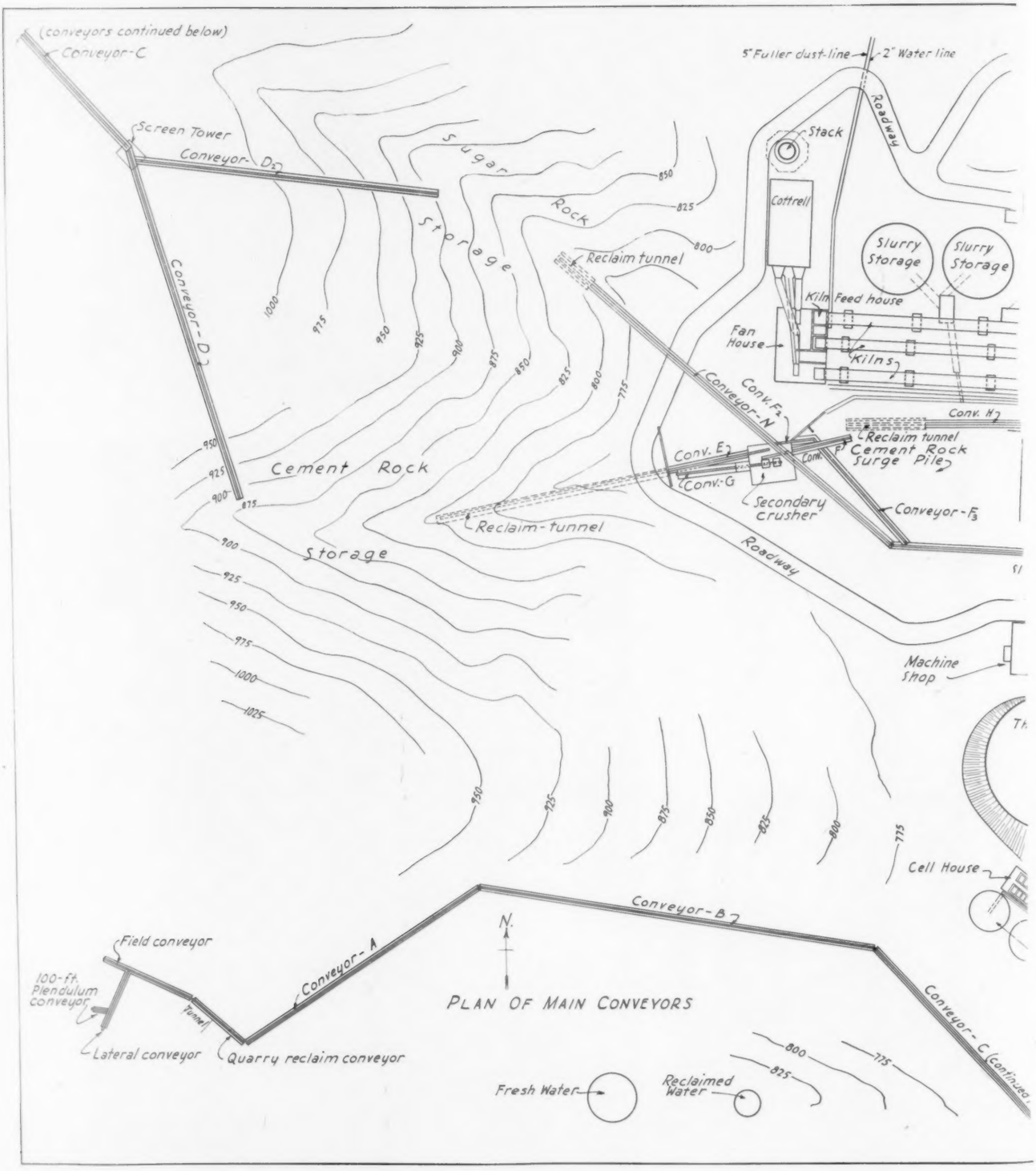
A view of the three kilns and the burner building. Part of clay and slurry tanks at left.

Special truck-trailer being loaded with bulk cement. By removing the top the same unit may be used to haul sacked cement.

Screen which sizes commercial stone.

Screen which scalps oversize cement rock to cone crusher.

*(Reference to the accompanying flow-sheet and tabular analysis will be found helpful.—Ed.)

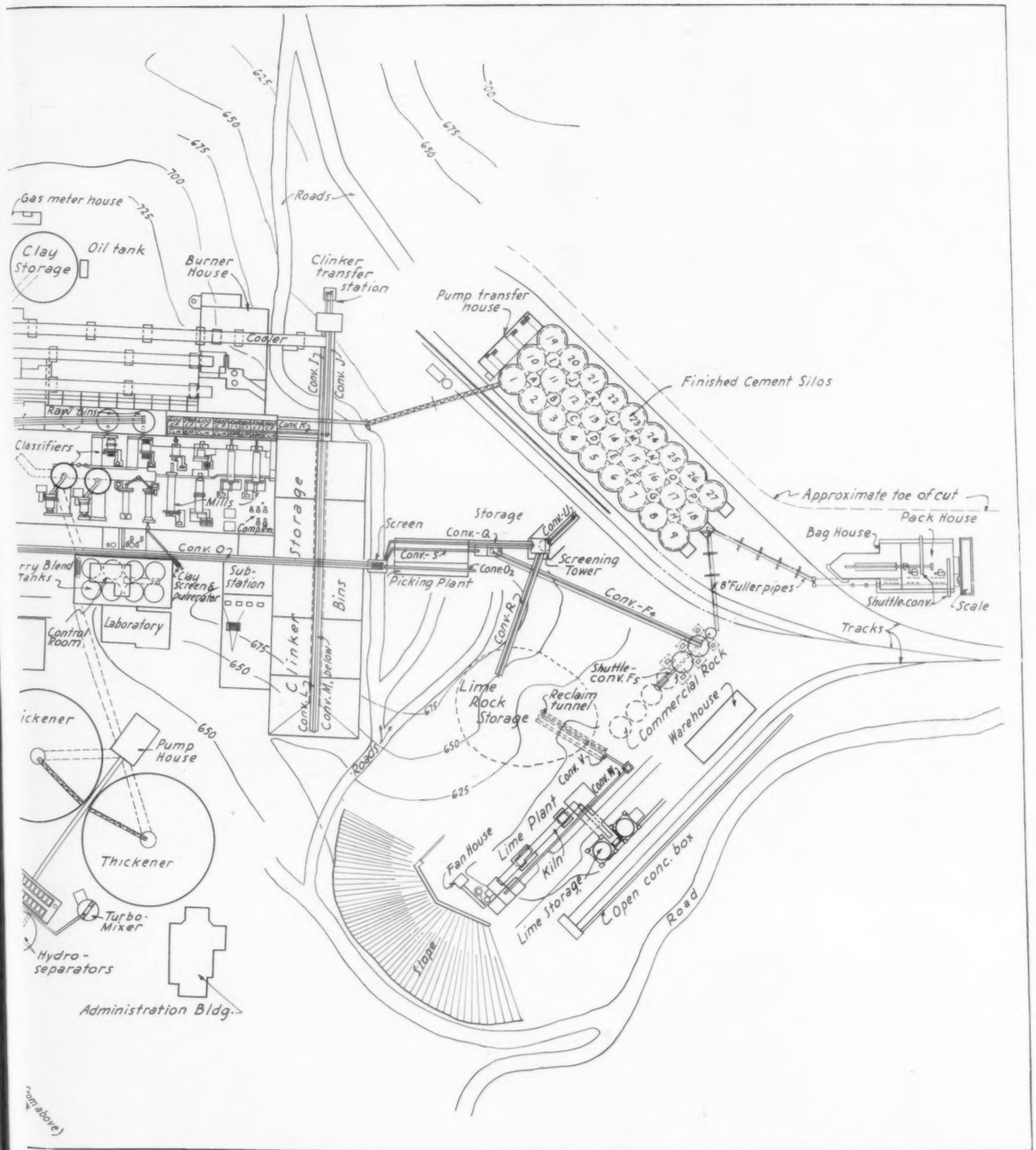


Drawing showing general plan of the Perma

bents and the footings.

From conveyor *C* the stone is discharged on a 5- by 10-foot Tyler Ty-Rock 2-deck screen with 6- and 3-inch openings. This screen separates the sugar rock from that to be used for other products. The 3- to 6-inch sugar and lime rock is discharged on a 30-inch by 350-foot boom conveyor (*D2*), which discharges it on a 100,000-ton stock-pile in a ravine above the plant. This conveyor has a 54-foot drop and its motor is regenerative. The minus 3- and plus 6-inch rock is discharged on a 36-inch by 400-foot boom conveyor (*D*), which discharges it on the 550,000-ton stock-pile for the cement and crushed-stone plants. The drop from the discharge end of this conveyor to the top of the reclaiming tunnel is 300 feet. The capacity of this stock-pile is so great that most of the quarrying can be done during the October-through-December sugar-rock season, when the quarry is operated 5 days weekly and an average of 1,000 tons per hour is produced.

Cement-Rock Preparation Rock for the cement plant is withdrawn



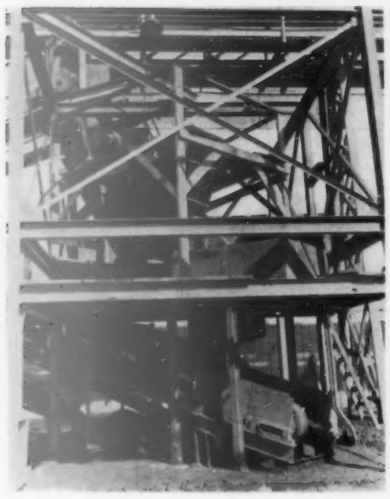
nente operations near Los Altos, California.

from the 550,000-ton storage-pile by a Jeffrey-Traylor vibrating feeder. Openings have been left in the top of the concrete reclaiming tunnel for two more feeders if more capacity or more live storage is desired. Belt-conveyor *E* usually feeds the stone to a 5- by 10-foot Ty-Rock 2-deck screen equipped with 1½- and ½-inch openings. Minus ½-inch material is carried on conveyor *F* to a cement-rock surge-pile with a live storage capacity of 5,160 tons. The oversize from this screen drops into a Kennedy Van Saun No. 49, low-head crusher, the ⅜-inch minus product of which is carried on conveyor *G* back to conveyor *E*, making a closed circuit. The ½- to 2½-inch middle-size material from this screen is also recrushed when cement rock is the only product desired. When some rock for the commercial crushed-stone plant is also needed, this middle size is fed to conveyor *F2*, followed by conveyor *F3*, which discharges on conveyor *O*.

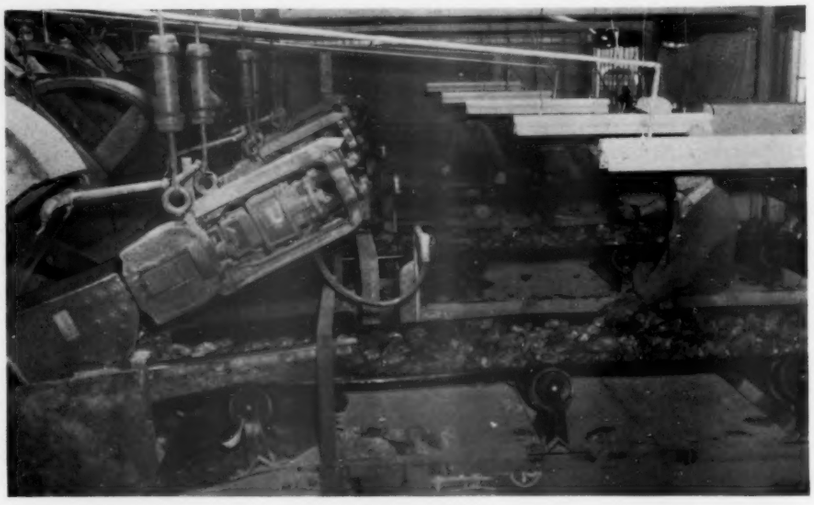
Conveyor *E* can also discharge the raw cement rock to another screen-and-crusher combination, consisting of a 4- by 10-foot Seco 2-deck screen and a

A view inside the main portion of the flotation-cell house.

One of the two 3-foot crushers used for the reduction of clinker.



Vibrating screen and pulverator with conveyor to clay mills beneath.



Vibrating feeders and picking conveyors in sugar-rock building.

The cement pack-house with truck-loading platform.

Quicklime storage silos with lime kiln at left.

Symons 4-foot short-head cone crusher. This system can be operated as a stand-by or as an alternate to the one just described. In the latter case conveyor *G* would discharge the recrushed rock on conveyor *G2* for return to the Seco screen. With these systems clean rock is assured for the commercial-rock plant.

It is also possible to operate both systems simultaneously in almost any desired combination. In such cases the screen and crusher openings are different in each circuit. In one combination often used the Ty-Rock screen has 1½- and ½-inch openings and the crusher is

The three electrically-vibrated screens in closed circuit with final clay mill.

set at ⅜-inch. The fines go on conveyor *F* to the surge-pile or on *F2* to the rock plant. The oversize can go to the Symons cone crusher as before, or on conveyor *F2* to the rock plant. The middle size goes to the Kennedy crusher and is carried with the Symons

Conveyor scale which weighs stone as it passes through quarry-reclaiming tunnel.

crusher product on conveyors *G* and *G2* to the Seco screen which is equipped with ¾- and ¼-inch openings. The undersize material from the Seco screen can go either on conveyor *F* to the surge-pile or on conveyor *F2* to the rock plant. The middle-size and oversize materials from the Seco screen can go either to the Symons crusher or on conveyor *F2* to the rock plant. When pit-run rock is ordered, raw cement rock from reclaiming conveyor *E* by-passes the crushing-and-screening plant and is discharged direct on conveyor *F2* followed by *F3* for loading out through the commercial-rock plant described later.

Raw-Material Grinding, Blending and Feeding A Jeffrey-Traylor vibrating feeder in the reclaiming tunnel under the cement-rock surge-pile feeds conveyor *H*, which discharges the rock direct into the 400-ton steel feed bin over the Traylor preliminary raw-grinding mill. It also feeds conveyor *H1*, which supplies the 400-ton bin over the Smidth preliminary mill. The Merrick Feedoweights feed at any desired rate to the two mills.

The 9½- by 10-foot Traylor mill has a 77,000-pound charge of 4-inch minus steel balls and the 9- by 10½-foot Smidth mill has a 77,000-pound charge of 3½-inch minus balls. Each mill is operated in closed circuit with a Dorr Type QSFXM Multi-Zone classifier with a 16-foot rake. The discharge of the mill at 75 per cent. solids is fed to the classifiers by Dorr sand-wheels. The feed to these classifiers contains 46 per cent. solids after the dilution water is added and the oversize coming from them has 80 per cent. solids. The oversize from the rake classifiers goes by gravity to the feed scoop and back to the mill.

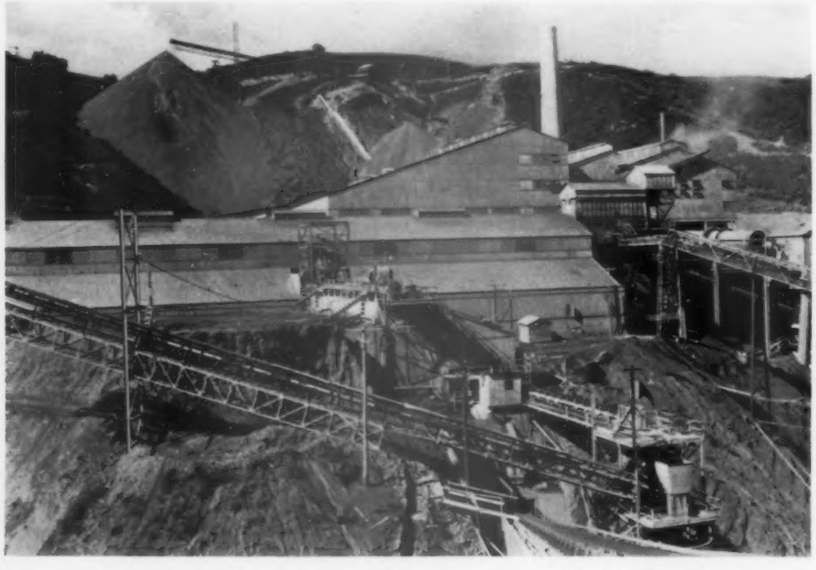
The product of the two Dorr Multi-Zone classifiers is a slurry containing 34 per cent. solids ground to 50 per cent. through 200-mesh. This goes through launders to three circular steel sumps, each feeding a 5-inch Wilfley pump.

When by-passing the flotation system, these three pumps feed the slip to

Classifier used in the production of stone-sand.

either or both of two Dorr 28-foot diameter bowl classifiers with 16-foot rakes. The 80-per cent. solid material from the rake of each bowl classifier returns to the secondary raw-grinding ball-mill. One of the two classifiers feeds a 9½- by 10-foot Traylor mill and the other a 9½- by 10-foot Allis-Chalmers mill. Each mill is loaded with 77,000 pounds of 2½-inch minus steel balls. The products of the mills, containing 70 per cent. solids, go back to the classifiers. The products of the classifiers flow through launders to circular steel sumps. Two 5-inch Wilfley pumps feed this slip, containing 10 per cent. solids at 97-per cent. through 200-mesh material, to the two 150-foot diameter Dorr thickeners.

When the flotation system is being used, the Wilfley pumps following the primary classifiers feed the classifier overflow into two Dorr 45-foot diameter hydroseparators with walls 3½-feet high. The overflow from the hydroseparators, containing about 3 per cent. of plus 325-mesh solids, flows through



The cement plant as viewed from the crushed-stone plant conveyor. Clinker-storage building in foreground.

launders into the thickeners. The underflow from the hydroseparators, containing 30 per cent. solids, flows by gravity into a 23-foot diameter by 23-foot Dorr turbo-mixer. This keeps the slip in agitation until it is fed by an 8-inch Byron-Jackson centrifugal process pump into the flotation cells.

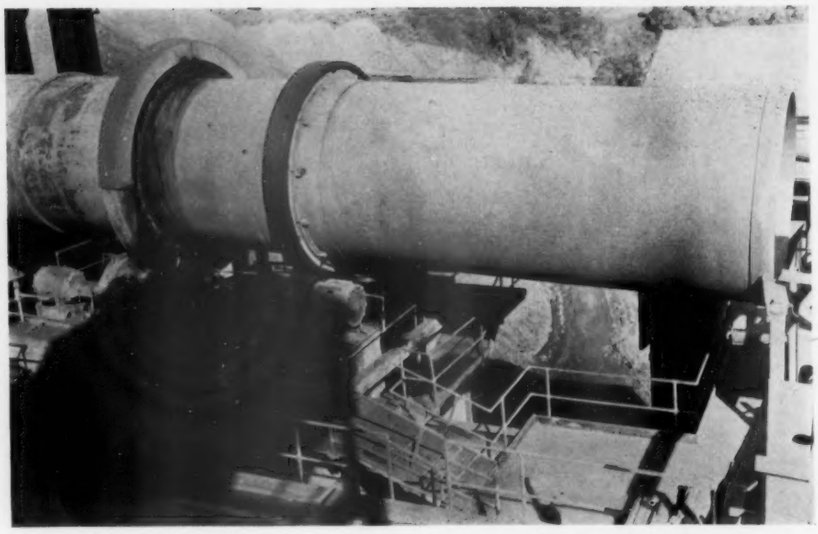
The heart of the flotation plant consists of Fagergren 66-inch sloping-side flotation cells made by the American Cyanamid Company. These cells are arranged in two parallel rows. In each row the first three cells are used as primary "roughers" and their product is finished concentrate. The tailings of these "rougher" cells go to two rows of three scavenger or secondary "rougher" cells each. The tailings from these cells are true "rejects" and are sent to waste from a sump by a 6-inch Byron-Jackson process pump. This waste contains 3 per cent. of solids of which 65 per cent. is plus 200-mesh.

The product of the scavenger cells goes to two batteries of two cleaner cells each. Their tailings go to a sump from which they are returned by a 6-inch Byron-Jackson pump to the turbo-mixer for reprocessing through the cells. The product of the cleaner cells, with the finished concentrate from the primary "rougher" cells, goes to a concrete sump, from which a 6-inch Western Machinery Company pump feeds it to the secondary bowl classifiers and ball-mills. Thence it passes to the thickeners.

The re-agents used in the flotation process are fed to the cells by individual Clarkson feeders adjustable to any rate of feed between 0.2 and 2,000 cubic centimeters per minute. All the handling of the re-agents is done with rotary gear pumps. The re-agent-mixing plant is located near a railroad siding with the equipment for heating and unloading fuel oil for the kilns. A Worthington Monobloc pump is used to increase the water pressure at the sprays in order to break up the concentrate froth.

The two 150-foot diameter Dorr thickeners have 10-foot walls and torque-type revolving rake arms. On each end of each arm is an Allen-Sherman-Hoff 4-inch Hydroseal Maximix pump, which takes the coarse material from the center of the thickener and distributes it around its periphery when this is necessary to prevent fluctuations.

Weighing feeder serving one of the raw mills.



Clinker cooler which serves the No. 1 kiln.

The underflow from the thickeners contains about 70 per cent. solids and is discharged into a split sump feeding two 5-inch Wilfley pumps. These pumps can either return the slip to the thickeners or feed it to the slurry-blending tanks. The flow from these pumps is controlled by Masco-Grigsby rubber pinch valves made by the Mine & Smelter Equipment Company and the underflow lines are equipped with Fuller automatic battery-operated cut-off valves.

The overflow from the thickeners is sent by two Byron-Jackson water pumps to a storage tank and a storage pond, from which the plant water is obtained.

Clay Clay suitable for use in making cement is plentiful near the plant and is being removed first from points where excavation is necessary for roadways or landscaping operations. Small shovels are used to load the clay into trucks, which discharge it into a hopper at one end of the blending tanks. A Link-Belt pan-feeder serves a belt-conveyor which feeds a 4- by 5-foot Allis-Chalmers 1-deck screen with ⅜-inch opening wire cloth.

The oversize goes to an Allis-Chalmers No. 3 Pulverator. The screen "throughs" and the crushed material are carried on another conveyor to the 7- by 26-foot Traylor two-compartment preliminary-grinding clay tube-mill.

The clay slip goes to a sump from which a 5-inch Wilfley pump feeds it to a battery of three 4- by 6-foot Tyler Hum-mer 1-deck screens equipped with 28-mesh cloth. The oversize material goes back to the mill, while the "throughs" flow by gravity into the Smidth 7- by 26-foot single-compartment final-grinding clay tube-mill.

The product of this mill goes to a sump from which a 5-inch Wilfley pump can feed it to the 80-foot diameter by 20-foot Dorr clay-storage tank or to any of the eight 132,000-cubic foot total capacity slurry-blending tanks. The storage tank feeds the blending tanks by gravity. Clay is recirculated in the storage tank by means of a 3-inch Wilfley pump. Both these clay pumps are equipped with Masco-Grigsby pinch valves and Fuller automatic shut-off valves.

Movable pump used to remove cement from silos.

The iron oxide used in making certain cements is received in trucks from local sources and is processed by the equipment used for clay. It does not need fine screening or fine grinding and is pumped from the preliminary mill direct to one of the blending tanks.

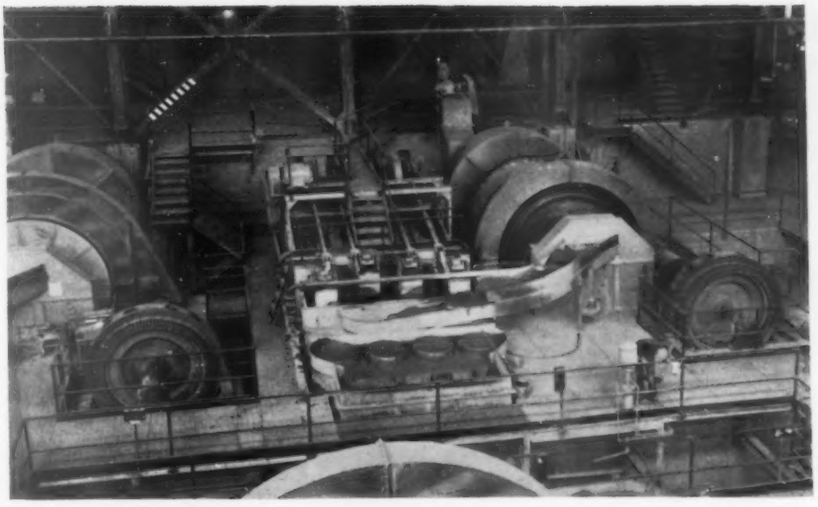
Under the blending tanks is a divided sump feeding two 8-inch Wilfley pumps which are equipped with Masco-Grigsby pinch valves and Fuller automatic cut-off valves. These pumps are used for blending in the tanks, whose contents are tested until the desired mix is obtained. The same pumps are used to feed the corrected slurry into the two 80-foot diameter by 20-foot slurry-storage tanks near the feed ends of the kilns. Provision is also made for pumping from the blending tanks back into the first clay mill. The blending tanks are equipped with Smidth intermittent air-agitators and the clay- and slurry-storage tanks have Dorr mechanical and-air agitators.

Slurry flows from the bottom centers of the storage tanks into sumps, from

The 60-horsepower motor drive on rotary compressor.

which two 5-inch Wilfley pumps transfer it to the feeders of the three kilns. A third pump serves as a stand-by and can also be used to recirculate the stored slurry. Slurry is ordinarily fed from one tank at a time to a distributing launder over the kiln feeders. Regulative gates control the rate of gravity feed from the launder to the feeders. An excess of slurry is always supplied to the feeders and the overflow goes back into the tank from which it was withdrawn. The No. 1 Traylor kiln has a 72-inch Ferris-wheel feeder and the Smidth No. 2 and 3 kilns have Smidth single spiral-scoop feeders. Funnels and feed pipes are used to introduce the slurry into the kilns. It is also possible to by-pass the slurry-storage tanks and to pump slurry from the blending tanks to the sumps of the kiln-feed pumps.

Burning and Cooling The No. 1 kiln in this plant is a 12-foot diameter by 450-foot Traylor unit. The No. 2 Smidth kiln and the new No. 3 Smidth kiln are 463¾ feet long and have diameters at different points of 12 feet 2 inches and 11 feet 2 inches. Each is rated at 3,500 barrels per hour. All ride on six rings and are equipped with recuperative chain systems at their feed ends.

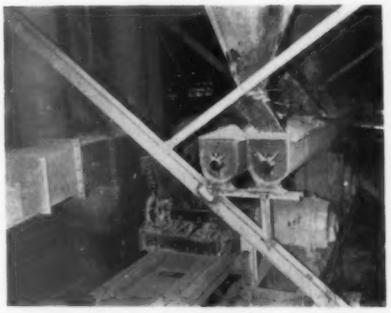


Classifier and raw primary ball-mill with weighing feeders in background.

The Traylor kiln has a 130-foot section with chains fastened at one end. It is provided with a Traylor Cheesman burner system.

The Smidth kilns have 93- and 90-foot sections with chains fastened at both ends. Both kilns have Johns-Manville insulation, Harbison-Walker or General Refractories 9-inch magesite brick in their burning zones, and Ensco or Stockton high-alumina and firebrick in other sections.

The clinker from the Traylor kiln drops into a 11½- by 120-foot Traylor rotary cooler which is brick-lined and equipped with lifters. Primary air is



Fans serving finish-separators and some of the screws used to blend finished cement.

drawn from the cooler through two 7-foot diameter size 60 Western Precipitation Corporation Polyclones by a Buffalo fan. These remove the dust and control the percentages of the air fed to the burner or wasted.

The two Smidth kilns have single-row, 10-cell, 5- by 30- foot Unax coolers, attached to their shells. These coolers, of the top-discharge type, are equipped with chains, and are lined for part of their length. The Smidth kilns are fired by Smidth gas burners with auxiliary air fans.

Surplus natural gas purchased from the Pacific Gas & Electric Company is used as fuel except for short periods during the winter months or at other times when the demand elsewhere is high. During these periods a stand-by fuel-oil system is used.

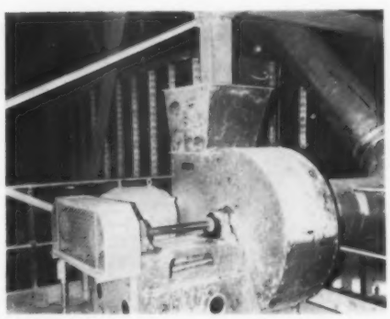
The No. 1 and No. 2 kilns are driven by 200-horsepower Westinghouse d.-c. motors.

The new Smidth No. 3 kiln is driven by a General Electric 200-horsepower B.T.A. variable-speed a.-c. motor. This type of motor gives variable-speed control with no variations due to loads and is comparatively new to the cement industry. Power is introduced into the motor at one end through a slip-ring. At the other end is a large commutator with two shifting yokes. By varying the brush positions with respect to the yokes a wide range of speeds is obtainable between 240 and 720 r.p.m. The motor-generators and exciters used with d.-c. motors and the electrical equipment required with other types of variable-speed a.-c. motors are eliminated.

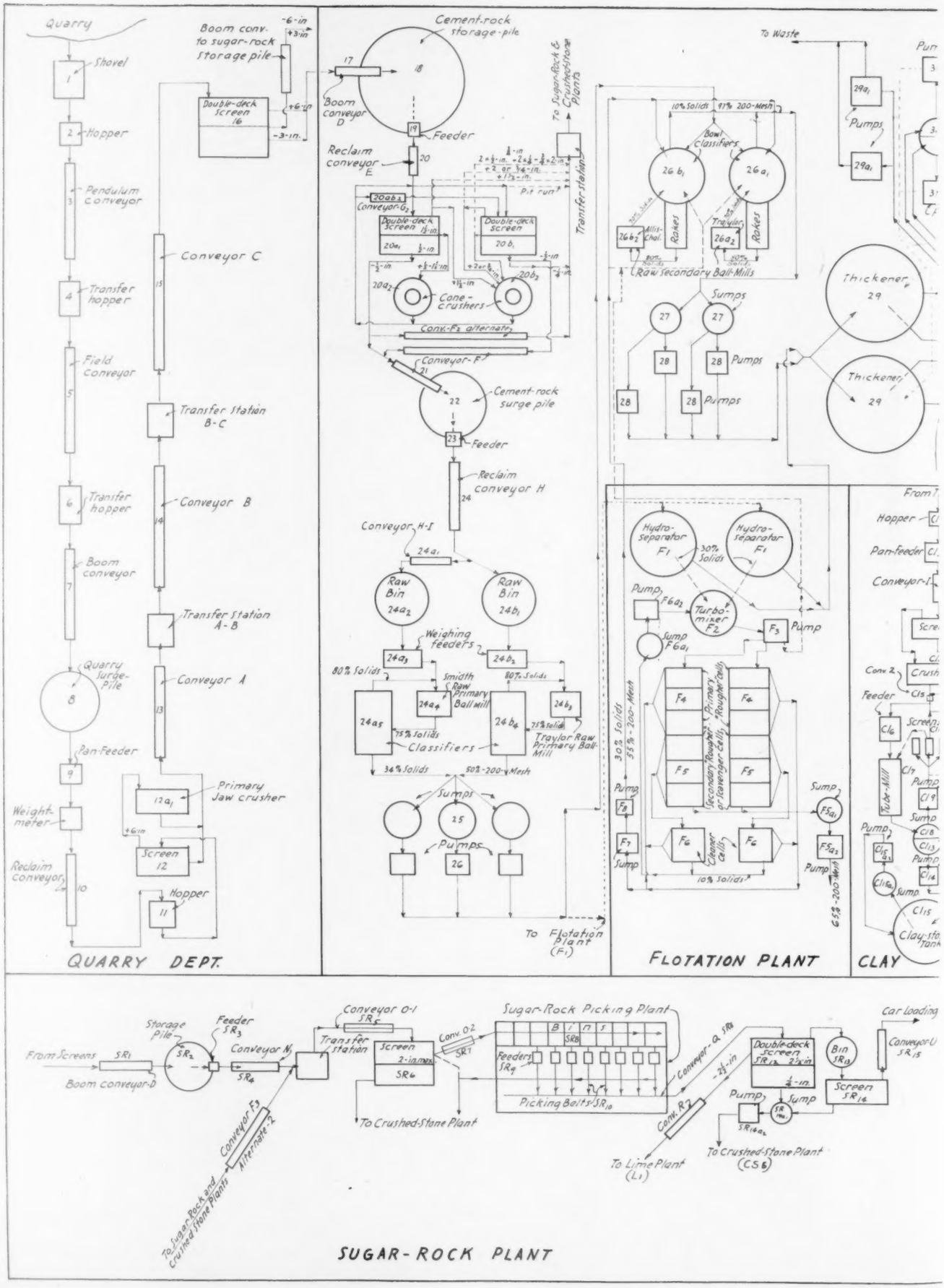
The two Smidth kilns are equipped with an auxiliary drive which can be used in case of power failure. Either kiln can be driven through a double gear arrangement by a 60-horse-power Buda gasoline engine.

F. L. Smidth & Company supplied

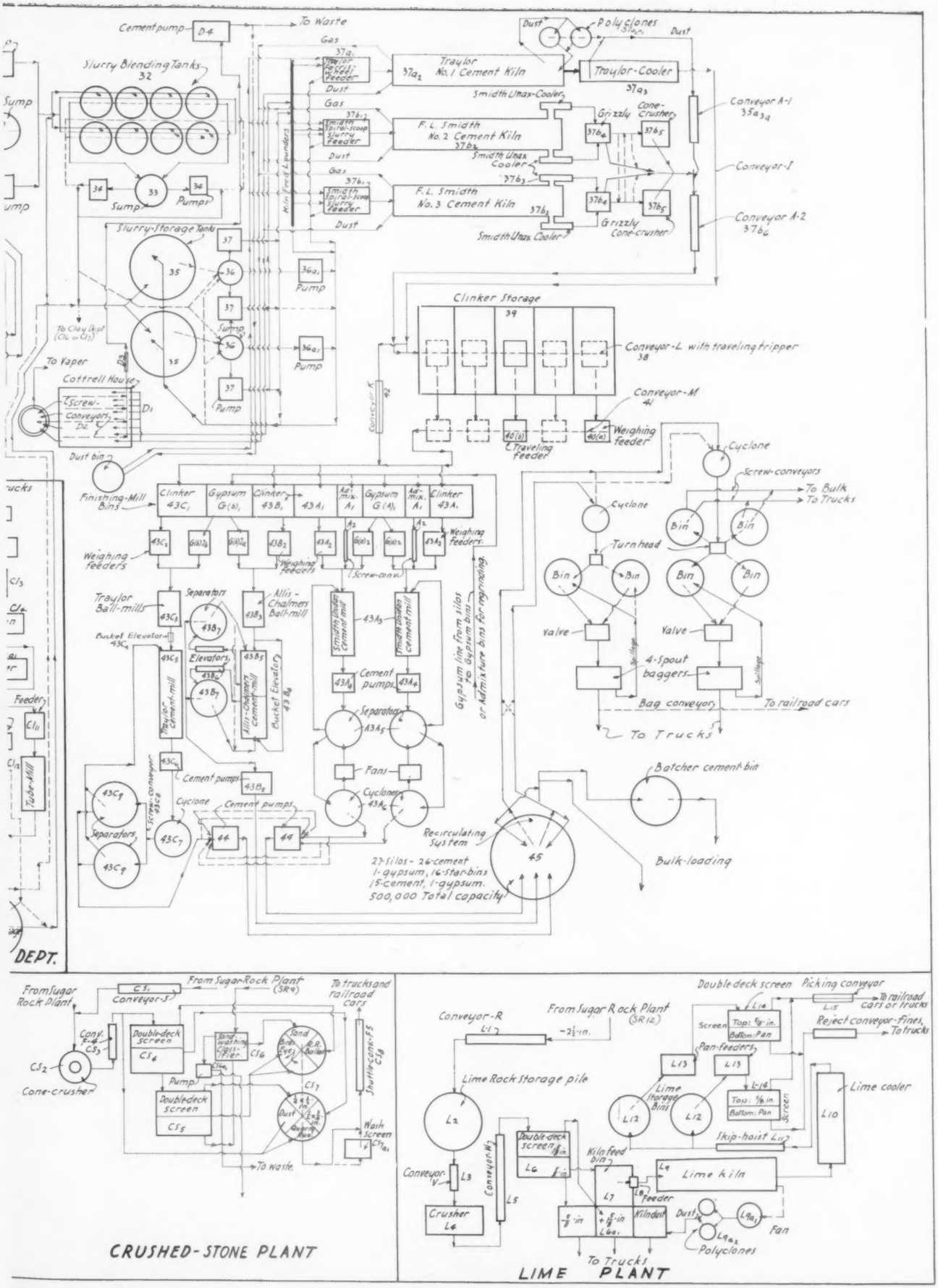
(*Continued on page 49*)



Fan on dust-collector which is connected to the new finish mill.


Quarry
Shovel
Hopper
Pendulum conveyor
Transfer hopper
Field conveyor
Transfer hopper
Boom conveyor
Quarry surge-pile
Pan-feeder
Weight-meter
Reclaim conveyor
Boom conv. to sugar-rock storage pile
Double-deck screen
Conveyor C
Transfer station B-C
Conveyor B
Transfer station A-B
Conveyor A
Primary Jaw crusher
Screen
Hopper
QUARRY DEPT.
Cement-rock storage-pile
Boom conveyor D
Feeder
Reclaim conveyor E
Transfer station
Pit run
Conveyor-G
Double-deck screen
Cone-crushers
Conv.-F alternate
Conveyor-F
Cement-rock surge pile
Feeder
Reclaim conveyor H
Conveyor H-I
Raw Bin
Weighing feeders
Smidth Raw Primary Ball Mill
Classifiers
Traylor Raw Primary Ball Mill
Sumps
Pumps
To Flotation Plant (F1)
To Waste
Pumps
Bowl Classifiers
Raw secondary Ball-Mills
Sumps
Thickener
FLOTATION PLANT
Hydro-separator F1
Turbo-mixer F2
Primary "Rougher" cells
Secondary "Rougher" or "Scavenger" cells
Cleaner cells
CLAY

Storage Pile
Feeder SR3
From Screens
Boom conveyor-D
Conveyor N
Transfer station
Conveyor O-1
Screen 2-in. mesh
To Crushed-Stone Plant
Conv. O-2
Sugar-Rock Picking Plant
Feeders SR9
Picking Belts SR10
Conveyor-Q
Conv. R
Double-deck screen
Bin SR13
Screen SR14
Car Loading
To Lime Plant (L1)
To Crushed-Stone Plant (CS6)
Conveyor F3 Alternate-2
To Sugar-Rock and Crushed-Stone Plants
SUGAR-ROCK PLANT



CRUSHED-STONE PLANT

LIME PLANT

TABULAR ANALYSIS OF THE PERMANENTE CORPORATION'S CEMENT, SUGAR-ROCK, CRUSHED-STONE, AND LIME PLANTS AT LOS ALTOS, CALIFORNIA—PART I.

(Key numbers refer to corresponding numbers on accompanying flow-sheet.)

	Operation	Key	Equipment	Make	Model Number, Size, Capacity or Type	Motors	Power Transmission
Rock Quarrying, Transporting, Storing and Reclaiming	Loading, Conveying and Scalping	1	Shovel	Bucyrus-Erie	120-B, electric, 5-cu. yd.		
		2	Hopper				
			Feeder	Jeffrey-Traylor	Vibrating		
		3	Conveyor, pendulum		Belt, 36-in. by 100-ft.	40-hp. Westinghouse	Gearmotor and chain
		4	Hopper, transfer				
		5	Conveyor, field		Belt, extendable	150-hp. U. S.	
		6	Hopper, transfer				
		7	Conveyor, boom		Belt, extendable	150-hp. U. S.	Chain
		8	Surge-pile		5,000-ton		
		9	Feeder	Link-Belt	Pan	20-hp., Westinghouse	
		10	Conveyor, reclaiming		Belt, 36-in. by 400-ft.		
			Weight Meter	Merrick	Weightometer	3-hp. G.E.	
		11	Hopper				
		12	Screen (Coarse to $12a_1$, fines to 13)	Tyler	Ty-Rock, vibrating, 5- by 10-ft., 1-deck	15-hp U. S.	V-belt
	Primary Crushing	$12a_1$	Crusher (To 13)	Farrel-Bacon	Jaw, 24- by 36-in., 100-t.p.h.	100-hp. Westinghouse	
	Conveying and Primary Separating		(From 12 and $12a_1$)				
		13	Conveyor A Transfer Station A-B		Belt, 36-in. by 1,630-ft.	200-hp. G.E. wound-rotor	Westinghouse reducer
		14	Conveyor B		Belt, 36-in. by 2,225-ft.	200-hp. G.E. wound-rotor	Westinghouse reducer
		15	Conveyor C		Belt, 36-in. by 1,300-ft.	200-hp. G.E. wound-rotor	Westinghouse reducer
		16	Screen (Coarse and fine to 17, intermediate to SR1)	Tyler	Ty-Rock, vibrating, 5- by 10-ft., 2-deck	15-hp. U.S.	V-belt
	Cement-rock Storing and Reclaiming		(From 16)				
		17	Conveyor D, boom		Belt, 36-in. by 400-ft.	75-hp. U.S.	Westinghouse reducer and chain
		18	Stock-pile		550,000-ton		
		19	Feeder	Jeffrey-Traylor	Vibrating		
			(From 19 and $20ab_1$)				
		20	Conveyor E, reclaiming (To $20a_1$, $20b_1$ or Alt1)		Belt, 30-in. by 376-ft.	30-hp. U.S.	Syncrogear and chain
Cement and Commercial Rock Preparing and Storing	No. 1 Screening and Crushing System		(From 20 and $20ab_1$)				
		$20a_1$	Screen (Coarse and intermediate to $20a_2$, fines to 21 or Alt1)	Tyler	Ty-Rock, vibrating, 5- by 10-ft., 2-deck	10-hp. U.S.	V-belt
		$20a_2$	Crusher (To $20ab_1$)	Kennedy-Van Saun	No. 49, gyratory	125-hp. Westinghouse wound-rotor	V-belt
	No. 2 Screening and Crushing System		(From 20 and $20ab_1$)				
		$20b_1$	Screen (Coarse and intermediate to $20b_2$, fines to 21 or Alt 1)	Seco	Vibrating, 4- by 10-ft., 2-deck	7½-hp. U.S.	V-belt
		$20b_2$	Crusher (To $20ab_1$)	Symons	4-ft. short-head cone	150-hp. Westinghouse wound-rotor	V-belt
			(From $20a_2$ and $20b_2$)				
		$20ab_1$	Conveyor G (To 20 or 20a)		Belt, 24-in. by 123-ft.	U.S. 20-hp.	Syncrogear and chain
			(From $20ab_1$)				
		$20ab_2$	Conveyor G2 (To $20b_1$)		Belt, 24-in. by 123-ft.		
	Alternative Feed to Crushed-Stone Plant		(Pit-run from 20; sized from $20a_1$ and $20b_1$)				
		Alt 1	Conveyor F2		Belt, 24-in. by 49-ft.	10-hp. U.S.	Syncrogear and chain
		Alt 2	Conveyor F3 (To SR5)		Belt, 24-in. by 165-ft.	25-hp. U.S.	Syncrogear and chain
	Cement-Rock Storage		(From $20a_1$ and $20b_1$)				
		21	Conveyor F		Belt, 30-in. by 119-ft.	30-hp. U.S.	Syncrogear and chain
		22	Surge-pile		5,160-ton live		
		23	Feeder	Jeffrey-Traylor	Vibrating		
		24	Conveyor H, reclaiming (To $24a_1$ and $24b_1$)		Belt, 24-in. by 200-ft.	40-hp. Westinghouse	Gearmotor and chain
Preliminary Raw Grinding and Slip Handling	Circuit No. 1		(From 24)				
		$24a_1$	Conveyor H 1		Belt, 24-in. by 30-ft.	3-hp. U.S.	Syncrogear and chain
		$24a_2$	Bin		400-ton, steel		
		$24a_3$	Feeder	Feedoweight		1½-hp. U.S.	Varidrive Syncrogear
			(From $24a_3$ and $24a_5$)				
		$24a_4$	Mill	F. L. Smidth	Ball, 9-ft. by 10½-ft.	500-hp. G.E. synchronous	
		$24a_5$	Classifier (Oversize to $24a_4$, product to 25)	Dorr	Type QSFXM Multi-Zone, 16-ft. rake	30-hp. U.S.	V-belt (V-flat)
	Circuit No. 2		(From 24)				
		$24b_1$	Bin		400-ton, steel		
		$24b_2$	Feeder	Merrick	Feedoweight	1½-hp. U.S.	Varidrive Syncrogear
			(From $24b_2$ and $24b_4$)				
		$24b_3$	Mill	Traylor	Ball, 9½-ft. by 10-ft.	500-hp. G.E. synchronous	V-belt (V-flat)
		$24b_4$	Classifier (Oversize to $24b_3$, product to 25)	Dorr	Type QSFXM Multi-Zone, 16-ft. rake	30-hp. U.S.	
	Slip Handling		(From $24a_5$ and $24b_4$)				
		25	Sumps (3)				
		26	Pumps (3) (To $26a_1$ and $26b_1$ or F1)	Wilfley	5-in. centrifugal	50-hp. U.S.	V-belt

(*Continued on next page*)

TABULAR ANALYSIS OF THE PERMANENTE CORPORATION'S CEMENT, SUGAR-ROCK, CRUSHED-STONE, AND LIME PLANTS AT LOS ALTOS, CALIFORNIA—PART II.

(Key numbers refer to corresponding numbers on accompanying flow-sheet.)

	Operation	Key	Equipment	Make	Model Number, Size, Capacity or Type	Motors	Power Transmission
Secondary Raw Grinding and Slip Handling	Circuit No. 1	$26a_1$	(From 26, $26a_1$, or F8) Classifier (Coarse to $26a_2$, product to 27)	Dorr	Bowl, 28-ft. diam., 16-ft. rake	7½-hp. U.S., 20-hp. U.S.	V-flat and variable reducer
		$26a_2$	Mill (To $26a_1$)	Traylor	Ball, 9½-ft. by 10-ft.	500-hp. G.E. synchronous	
	Circuit No. 2	$26b_1$	(From 26 and $26b_1$) Classifier (Coarse to $26b_2$, product to 27)	Dorr	Bowl, 23-ft. diam., 16-ft. rake	7½-hp. U.S., 20-hp. U.S.	V-flat and variable reducer
		$26b_2$	Mill	Allis-Chalmers	Ball, 9½- ft. by 10-ft.	500-hp. G.E. synchronous	
	Slip Handling	27	(From $26a_1$ and $26b_1$) Sumps (2)		6-ft. diam. by 6-ft.	60-hp. Westinghouse (2)	V-belt
		28	Pumps (4) (To 29)	Wilfley	5-in. centrifugal	60-hp. U.S. (2)	V-belt
Flotation Department	Feed	F 1	(From 26) Separators (2) (Overflow to 29, underflow to F2)	Dorr	Hydro-separator, 45-ft. diam.	5-hp. U.S. (2)	Varidrive syncrogear
		F 2	(From F1 and $F6a_2$) Turbo-mixer	Dorr	23-ft. diam., by 23-ft.	20-hp. U.S.	Gear
		F 3	Pump	Byron-Jackson	8-in. Process	40-hp. U.S.	V-belt
	"Roughing"	F 4	Cells, primary rougher (6) (Product to F7, tailings to F5)	American Cyanamid	66-in. Fagergren	15-hp. Crocker Wheeler (6)	V-belt
		F 5	Cells, secondary rougher (6) (Product to F6, tailings to $F5a_1$)	American Cyanamid	66-in. Fagergren	15-hp. Crocker Wheeler (6)	V-belt
	Waste	$F 5a_1$	Sump				
		$F 5a_2$	Pump (To waste pond)	Byron-Jackson	6-in. Process	60-hp. U. S.	V-belt
	Cleaning	F 6	(From F5)) Cells, cleaner (4) (Product to F7, tailings to $F6a_1$)	American Cyanamid	66-in. Fagergren	15-hp. Crocker Wheeler (6)	V-belt
	Tailings Recirculating	$F 6a_1$	Sump				
		$F 6a_2$	Pump (To F2)	Byron-Jackson	6-in. Process	20-hp. Master	V-belt
	Product Handling	F 7	(From F4 and F6) Sump				
		F 8	Pump (To $26a_1$)	Western-Machinery	6-in. centrifugal	60-hp. U. S.	V-belt
Slurry Blending, Storing and Feeding	Thickening and Handling	29	(From 28, 31 or F1) Thickeners (2) Pumps (4) (Underflow to 30, overflow to $29a_1$)	Dorr Allen-Sherman-Hoff	150-ft. diam. torque type Hydroseal Maximix, 4-in. recirculating	3-hp. U. S. (2)	Syncrogear and gear
		30	(From 29) Sump				
		31	Pumps (2) (To 32 or 29)	Wilfley	5-in.	75-hp. U. S.	V-belt
	Waste	$29a_1$	(From 29) Pumps (2) (To waste pond)	Byron-Jackson	10-in. centrifugal	250-hp. Westinghouse	Direct
	Blending	32	(From Cl 13 or 34) Tanks (blending) (8)	Smidth	Cylind. steel 132,000 cu. ft. each		
		33	Sumps (2)				
		34	Pumps (2) (To 32, 35, or Cl 5)	Wilfley	8-in.	150-hp. U. S. (2)	V-belt
	Storing	35	(From $36a_1$, $37a_1$, and $37b_1$) Tanks (2)	Dorr	Storage, 80-ft. diam. by 20-ft. mechanical-and-air agitators	25-hp. U. S. (2)	Syncrogear and gear
		36	Sump (To $36a_1$ or 37)				
	Recirculating	$36a_1$	(From 36) Pumps (2) (To 35)	Wilfley	3-in.	15-hp. Westinghouse	V-belt
	Feeding	37	(From 36) Pumps (3) (To $37a_1$ and $37b_1$)	Wilfley	5-in.	75-hp. G.E. (3)	V-belt
Burning and Clinker Cooling and Crushing	Circuit No. 1	$37a_1$	(From 37) Feeder (To $37a_2$, overflow to 35)	Traylor	27-in. Ferris-wheel	7½-hp. d.-c. Westinghouse	Gearmotor
		$37a_2$	Kiln (To $37a_3$, dust to D1)	Traylor	12-ft. by 450-ft. rotary	200-hp. d.-c. Westinghouse	
		$37a_3$	Cooler	Traylor	6- by 120-ft. rotary	75-hp. U. S.	Gear
			Fan	Buffalo			
			Collector (Clinker to $37a_4$, dust to $37a_3a_1$)	Western Precipitation	Polyclones, dual		
		$37a_4$	Conveyor I (To 38 or 42)		Belt, 18-in. by 100-ft.		
		$37a_3a_1$	Conveyor A1 (To $37b_4$)		Belt, 24-in. by 64-ft.		
	Circuit No. 2	$37b_1$	(From 37) Feeders (2) (To $37b_2$, overflow to 35)	Smidth	Single spiral-scoop	3-hp. Ideal (2)	
		$37b_2$	Kilns (2) (To $37b_3$, dust to D1)	Smidth Smidth	12-ft. 2-in. rotary 11-ft. 2-in. by 463¾-ft.	200-hp. d.-c. Westinghouse 200-hp. G.E., B.T.A.	

(*Continued on page 46*)

ROTARY KILNS

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TABULAR ANALYSIS OF THE PERMANENTE CORPORATION'S CEMENT, SUGAR-ROCK, CRUSHED-STONE, AND LIME PLANTS AT LOS ALTOS, CALIFORNIA—PART III.

(Key numbers refer to corresponding numbers on accompanying flow-sheet.)

	Operation	Key	Equipment	Make	Model Number, Size, Capacity or Type	Motors	Power Transmission
Burning and Cooling (cont.)		$37b_3$	Coolers (2)	Smidth	Unax, 5- by 30-ft. single-row, 10-cell		
		$37b_4$	Grizzlies (2) (Coarse to $37b_5$, fines to $37b_6$)				
		$37b_5$	Crushers (2)	Traylor	TY, 3-ft. gyratory	100-hp. U. S. (2)	V-belt
		$37b_6$	(From $37a_3a_1$, $37b_4$, and $37b_5$) Conveyor A2 (To 38 or 42)		Belt, 36-in. by 129-ft.		
Clinker Storing and Reclaiming	Storing	38	(From $37a_4$ and $37b_6$) Conveyor L		Belt, 18-in. by 331-ft.	10-hp. U. S.	Syncrogear
		39	Tripper Storage, clinker	Bodinson	Traveling, automatic 5-compartment, 130,000-bbl.		
	Reclaiming	40	(a) Feeders (2)	Merrick	Feedoweights, traveling	2-hp. Louis Allis	
		41	(b) Feeder Conveyor M	Jeffrey-Traylor	Vibrating, traveling Belt, 18-in. by 497-ft.	25-hp. U. S.	Syncrogear
		42	(From 41, $37a_4$ or $37b_6$) Conveyor K		Belt, 18-in. by 247-ft.	10-hp. U. S.	Syncrogear and chain
			Tripper (To 43)	Bodinson			
Finish Grinding and Separating	Circuit No. 1	$43a_1$	(Clinker from 42) Bins, finish-mill (2)				
		$43a_2$	Feeders (2)	Merrick	Feedoweights	1-hp. U. S. (2)	Varidrive, Syncrogear
		G(a)1	(From silos) Bin, gypsum				
		G(a)2	Feeders (2) (To $43a_3$)	Merrick	Feedoweights	1-hp. U. S. (2)	Varidrive, Syncrogear
		A 1	(From silos) Bin, admixture				
		A 2	Conveyors (2) (To $43a_2$, $43b_2$ and $43c_2$)		Screw		
			(Clinker from $43a_1$, gypsum from G(a)2, admixture from A2, coarse from $43a_5$)				
		$43a_3$	Mills (2)	Smidth	Unidan, 8- by 36-ft.	100-hp. G.E. synchronous	
		$43a_4$	Pumps (2)	Fuller-Kinyon	6-in. pneumatic	60-hp. U. S. (2)	Direct
		$43a_5$	Separators (2) (Coarse to $43a_3$, cement to $43a_6$)	Smidth	11-ft. diam.	40-hp. G.E. B.T.A. (2)	
		$43a_6$	Cyclones (2) Fan (Cement to blending screws or to 44, air to $43a_5$)	Smidth	9-ft. diam.		
	Circuit No. 2	$43b_1$	Bin, finish-mill				
		$43b_2$	Feeder	Merrick	Feedoweight	1-hp. U. S.	Varidrive Syncrogear
		G(b)1	Bin, gypsum (To G(b)2a and G(b)2b)				
		G(b)2a	(From G(b)1) Feeder (To $43b_1$)	Merrick	Feedoweight	1-hp. U. S.	Varidrive Syncrogear
		G(b)2b	(From G(b)1) Feeder (To $43c_1$)	Merrick	Feedoweight	1-hp. U. S.	Varidrive Syncrogear
			(Clinker from $43b_1$, gypsum from G(b)2a, admixture from A2)				
		$43b_3$	Mill	Allis-Chalmers	Preliminator, 9-ft. by 10-ft.	500-hp. G.E. synchronous	
		$43b_4$	Elevator (To $43b_4a_1$ and one end of $43b_5$)		Bucket		
		$43b_4a_1$	Conveyor (To other end of $43b_5$)		Screw		
			(From $43b_4$, $43b_4a_1$ and $43b_7$)				
		$43b_5$	Mill	Allis-Chalmers	Ball-Peb, 8- by 40-ft., 2 separated compartments	1,000-hp. G.E. synchronous	
		$43b_6$	Elevators (2)		Bucket	20-hp. U. S. (2)	Syncrogear
		$43b_7$	Separators (2) (Coarse to both ends of $43b_5$, and to $43b_8$)	Raymond	16-ft. diam., dual Whizzer	75-hp. U. S. (2)	V-belt
		$43b_8$	Pump (To cement blending system or 45)	Fuller-Kinyon	6-in. pneumatic	100-hp. U. S.	Direct
	Circuit No. 3	$43c_1$	Bin, finish-mill				
		$43c_2$	Feeder (Clinker from $43c_2$, gypsum from G(b)2b, admixture from A2)	Merrick	Feedoweight	1-hp. U. S.	Varidrive Syncrogear
		$43c_3$	Mill	Traylor	Preliminator ball $9\frac{1}{2}$-by 10 ft.	500-hp. U. S. synchronous	
		$43c_4$	Elevator		Bucket		
			(From $43c_4$ and $43c_9$)				
		$43c_5$	Mill	Traylor	8- by 40-ft., tube	1,000-hp. G.E. synchronous	
		$43c_6$	Pump	Fuller-Kinyon	8-in. pneumatic	100-hp. U. S.	Direct

(*Continued on next page*)

TABULAR ANALYSIS OF THE PERMANENTE CORPORATION'S CEMENT, SUGAR-ROCK, CRUSHED-STONE, AND LIME PLANTS AT LOS ALTOS, CALIFORNIA—PART IV.

(Key numbers refer to corresponding numbers on accompanying flow-sheet.)

	Operation	Key	Equipment	Make	Model Number, Size, Capacity or Type	Motors	Power Transmission
		43c7 43c8 43c9	Cyclone Conveyor Separators (2) (Cement to blending screws or 44, coarse to 43c5)	Raymond	Screw, 2-way 16-ft. diam. dual Whizzer	75-hp. U. S. (2)	V-belt
Cement Storage	Cement Storage	44 45	(From cement blending system, 43a6 or 43c9) Pumps (2) (From 43b8 or 44) Silos (27) (To packhouse, bulk-loading bins or direct to cars)	Fuller-Kinyon Rust Eng. Co.	7-in. pneumatic Concrete	125-hp. U. S.	Direct
Clay and Iron-Oxide Processing	Raw Preparation	Cl 1 Cl 2 Cl 3 Cl 4	(From trucks) Hopper Feeder Conveyor Screen (Oversize to Cl 4a1 through to Cl 5)	Link-Belt Allis-Chalmers	Pan Belt, 24-in. by 115-ft. Vibrating, 4-ft. by 5-ft., 1-deck	7½-hp. U. S. 7½-hp. U. S. 1-hp. Allis-Chalmers	Varidrive Syncrogear and chain Syncrogear and chain V-belt
		Cl 4a1	(From Cl 4) Crusher (To Cl 5)	Allis-Chalmers	Pulverator, No. 3	50-hp. Allis-Chalmers	V-belt
		Cl 5	(From Cl 4 and Cl 4a1) Conveyor 2		Belt, 24-in. by 57-ft.	10-hp. U. S.	Syncrogear and chain
	Grinding	Cl 6 Cl 7 Cl 8 Cl 9	From Cl 5 and Cl 10) Feeder (From Cl 6 and Cl 10) Mill Sump Pump (Clay to Cl 10, iron oxide to Cl 3)	Traylor Wilfley	Tube, 7- by 26-ft. 5-in.	500-hp. G.E. synchronous 100-hp. U. S.	V-belt
	Screening and Grinding	Cl 10	Screens (3) (Oversize to Cl 6; through to Cl 11)	Tyler	Hum-mer, 4- by 6-ft. 1-deck,		
		Cl 11 Cl 12 Cl 13 Cl 14	(From Cl 10 and 34) Feeder Mill Sump Pump	Smidth Wilfley	Tube, 7- by 26-ft. 5-in.	500-hp. G.E. synchronous 100-hp. U. S.	V-belt
		Cl 15	(From Cl 14 and Cl 15a2) Tanks (To 32 or Cl 15a1)	Dorr	Storage, 80-ft. diam. by 20-ft.	25-hp. U. S.	Syncrogear and gear
	Recirculation	Cl 15a1 Cl 15a2	From Cl 15) Sump Pump (To Cl 15)	Wilfley	3-in.	15-hp. Westinghouse	V-belt
Kiln-Dust Collection	Collection and Disposal	D 1	(Gas and dust from 37a2 and 37b2) Fans (3) Precipitator (Gas to stack, dust to D 2) Stack	Buffalo Western Precipitation Corp. Rust Eng. Co.	No. 54 draft Cottrel electrical, 4-unit, 1,280,000-c.f.m. Concrete, 225-ft. by 18-ft. interior diam.		
		D 2 D 3 D 4 D 5	Conveyors (4) Conveyor Pump (To D 5 or waste) Bin (To 37a1 and 37b1)	Fuller-Kinyon	Screw, 9-in. Screw, 9-in. 5-in. pneumatic 400-bbl.	40-hp. U. S.	Direct

SUGAR-ROCK PLANT

Raw Sugar-Rock Storing and Reclaiming	SR 1 SR 2 SR 3 SR 4	(From 16) Conveyor D 2 Stock-pile Feeder Conveyor N	Jeffrey-Traylor	Boom, belt, 30-in. by 350-ft. 100,000-ton Vibrating Belt, 24-in. by 423-ft.	40-hp. Westinghouse 15-hp. U. S.	Gearmotor Syncrogear and chain
	SR 5	(From SR 4 and Alt. 1 and Alt. 2) Conveyor O 1		Belt, 24-in. by 500-ft.	10-hp. U. S.	Syncrogear and chain
Degradation Removal	SR 6	Screen (Coarse to SR 7, fines to CS 1)	Seco	Vibrating 4-by 8-ft., 2-deck	7½-hp. U. S.	V-belt
Picking	SR 7 SR 8 SR 9 SR 10	Conveyor O 2 Tripper Bins (10) Feeders (8) Conveyors (8) (Rock to SR 11, rejects to CS 1)	Bodinson Jeffrey-Traylor	Belt, 24-in. by 150-ft. Traveling 1,000-ton total Vibrating Picking belt, 30-in. by 20-ft.	7½-hp. U. S. 1¼-hp. U. S. (8	Syncrogear and chain Varidrive Syncrogear and chain

(*Continued on next page*)

TABULAR ANALYSIS OF THE PERMANENTE CORPORATION'S CEMENT, SUGAR-ROCK, CRUSHED-STONE, AND LIME PLANTS AT LOS ALTOS, CALIFORNIA—PART V.

(Key numbers refer to corresponding numbers on accompanying flow-sheet.)

Operation	Key	Equipment	Make	Model Number, Size, Capacity or Type	Motors	Power Transmission
Washing, Storing and Loading	SR 11	Conveyor Q		Belt, 24-in. by 110-ft.	3-hp. U. S.	Syncrogear and chain
	SR 12	Screen (Oversize to SR 13, intermediate to L 1, fines to SR $14a_1$)	Tyler	Ty-Rock, vibrating, 5-by 10-ft., 2-deck	10-hp. U. S.	V-belt
	SR 13	Bin		200-ton cylindrical steel		
	SR 14	Screen (Oversize to SR 15, fines to SR $14a_1$)	Seco	Vibrating 4- by 8-ft., 1-deck	5-hp. U. S.	V-belt
	SR 15	Conveyor U (To cars for shipment)		Belt, 30-in. by 60-ft.	7½-hp. U. S.	Syncrogear and chain
Waste-Water Disposal	SR $14a_1$	(From SR 12) Sump				
	SR $14a_2$	Pump (To CS 6)	Wilfley	3-in., centrifugal	2-hp. U. S.	V-belt
CRUSHED-STONE PLANT						
Crushing, Screening and Sand Classifying	CS 1	(From SR 6 and SR 10) Conveyor S		24-in. by 120-ft.	3-hp. U. S.	Syncrogear and chain
	CS 2	Crusher	Nordberg	Symons 4-ft., shorthead cone	100-hp.	
	CS 3	Conveyor F_1		Belt, 24-in. by 266-ft.	40-hp. U. S.	Falk reducer and chain
	CS 4	Screen (Coarse and intermediate to CS 7, fines to CS 5)	Tyler	Ty-Rock, vibrating 5-by 12-ft., 2-deck	10-hp. U. S.	V-belt
	CS 5	(From CS 4) Screen (Coarse and intermediate to CS 7, overflow to CS $6a_1$)	Tyler	Ty-Rock, vibrating 5-by 12-ft., 2-deck	10-hp. U. S.	V-belt
	CS 6	(From SR $14a_2$ and CS 5) Classifier (Sand to CS 7, overflow to CS $6a_1$)	Bodinson	Rake	10-hp. U. S.	Syncrogear and chain
Storage, Rinsing and Loading	CS 7	(From CS 4, CS 5 and CS 6) Bins (2) (To CS $7a_1$ or CS 8)		4 compartment, 1,200-ton cylindrical steel		
	CS $7a_1$	Screen (To CS 8)	Allis-Chalmers	Vibrating, 4-by 5-ft., 1-deck	2-hp. Allis-Chalmers	
	CS 8	(From CS 7 or CS $7a_1$) Conveyor F 5		Belt, shuttle, 30-in. by 70-ft.	7½-hp. U. S.	Syncrogear and chain
Waste Disposal	CS $6a_1$	(Overflow from CS 6) Pump (To settling pond)	Wilfley	5-in.		
LIME PLANT						
Lime-rock Storage	L 1	(From SR 12) Conveyor R		Belt, 24-in. by 186-ft.	15-hp. U. S.	Syncrogear and chain
	L 2	Stock-pile		27,000-ton		
	L 3	Conveyor V		Belt, 24-in. by 103-ft.	5-hp. U. S.	Syncrogear and chain
Crushing and Screening	L 4	Crusher	Traylor	Bulldog 4-ft. gyratory	50-hp. Westinghouse	
	L 5	Conveyor W		Belt, 18-in. by 204-ft.	25-hp. U. S.	Syncrogear and chain
	L 6	Screen (Oversize and undersize to L $6a_1$, intermediate to L 7)	Seco	Vibrating, 4- by 10-ft., 2-deck	10-hp. U. S.	V-belt
Commercial Stone Storing	L $6a_1$	(From L 6 and L $9a_2$) Bins (3) (To trucks)		Concrete		
Lime Burning	L 7	Bin		Concrete		
	L 8	Feeder	Link-Belt	Pan	3-hp. Westinghouse wound-rotor	Gear
	L 9	Kiln (Lime to L 10, dust to L $9a_1$)		Rotary, 8 by 125-ft.	25-hp. Westinghouse wound-rotor	Gear
Dust Collection	L $9a_1$	Fan				Direct
	L $9a_2$	Collector (To L $6a_1$)	Western Precipitation	Polyclone, dual		Direct
Lump-lime Cooling, Storing, Screening, and Loading	L 10	(From L 9) Cooler	Joshua Hendy	Rotary, 5- by 50-ft.	15-hp. U. S.	Syncrogear
	L 11	Skip-hoist	Link-Belt	Automatic, 20-cu. ft.	10-hp. U. S.	
	L 12	Bins (2)		5,400-bbl. cylindrical steel		
	L 13	Feeders (2)	Link-Belt	Pan, 18-in.	1½-hp. U. S. (2)	Varidrive Syncrogear and chain
	L 14	Screens (2) (Lump lime to L 15 fines to L $14a_1$)	Seco	Type J, 2-by 6-ft., 2-deck	3-hp. U. S. (2)	V-belts
	L 15	Conveyor (Lump lime to cars or trucks, rejects to L $14a_1$)		Picking belt, 30-in. by-92-ft.	3-hp. U. S.	Varidrive, Syncrogear and chain
Waste-Lime Disposal	L $14a_1$	(From L 14 and L 15) Conveyor		Belt, 18-in. by 44-ft.	1-hp. U. S.	Syncrogear and chain
	L $14a_2$	Conveyor (To trucks)		Belt, 18-in. by 9-ft., 4-in.	1-hp. U. S.	Syncrogear and chain

the control equipment for the three kilns. The controls and recorders for the No. 1 and No. 2 kilns are on one board and those for the No. 3 kiln are on another. On these boards are electrical and automatic thermo-controls, tachometers, pyrometers, draft gages, gas analyzers, etc.

Draft is furnished by individual No. 54 F.L.S. Buffalo fans through Smidth automatically-controlled dampers.

The gases and dust pass through separate ducts into a Western Precipitation Corporation Cottrell electrical precipitator. The gases go to atmosphere through a Rust reinforced-concrete stack 225 feet high and 18 feet in diameter inside. The dust-collection efficiency consistently exceeds 98 per cent. Initially, with only two kilns in operation, the efficiency was well over 99 per cent.

The Cottrell precipitator has four units or parallel chambers of five sections each and is designed to handle 320,000 cubic feet per minute of gases at 300 to 500 degrees F. The rod-curtain electrodes used are 18 feet high and 8 feet wide and are spaced 8 inches apart. There are 15 ducts or sets of electrodes in each section. The precipitator is operated by ten sets of electrical equipment, each including a rectifier, a transformer, a switchboard and the necessary switches. A line voltage of 440 volts, 3-phase, 60 cycles is used and the transformers have a top voltage of 60,000 with steps of 5,000 each down to 40,000 volts.

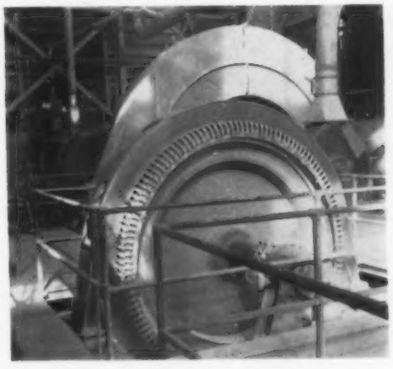
The precipitators are totally inclosed in steel and have a new type of cover plate giving access to the curtains. A cover consists of a sealed and heat-insulated lower plate with rock wool between it and the readily-removable top plate.

Under each of the four precipitator chambers is a series of steel hoppers from any or all of which the dust is carried by screw-conveyors to a cross screw-conveyor feeding a hopper over a 5-inch Fuller-Kinyon pump. One of these screws also collects dust from the stack base. This dust can be discharged to waste in a canyon near the plant or into a 400-barrel dust-bin over the kiln slurry feeders. Individual screw-feeders supply dust to funnels on the kiln slurry-feed pipes. These funnels create a swirling action which mixes the dust with the slurry. With this system all, or any part of, the dust can be used or wasted as conditions require.

Clinker Cooling, Storage and Reclaiming The dust from the Western Precipitation Corporation Polyclones is discharged on belt-conveyor *A1*. The clinker from the Traylor cooler is discharged on belt-conveyor *I* feeding conveyor *L* running to the clinker-storage building. The clinker from the two Unax coolers is discharged over grizzlies which remove the fines before it is fed into either or both of two Traylor 3-foot TY gyratory crushers set at ⅜-inch maximum opening. The clinker passing through the grizzlies and the crushers is discharged on belt-conveyor *A2* on the top of the dust from conveyor *A1*. Conveyor *A2* feeds to conveyor *L*. If desired, the clinker from the Traylor cooler on conveyor *I* and that from conveyor *A2* can be discharged direct to belt-conveyor *K*, which distributes, by means of a tripper, into the clinker mill-feed bins.

Firing hood and coolers of the No. 2 kiln.

Conveyor *L* is equipped with a Bodinson automatic traveling tripper which distributes the clinker into the five V-bottom compartments of the 100-foot by 330-foot concrete storage bin. Four of the compartments hold 30,000 barrels each and the fifth has a capacity of 10,000 barrels. These compartments are formed by a ravine, which is concrete-lined, and they have concrete partition and end walls. The building is completely inclosed and is air-tight.

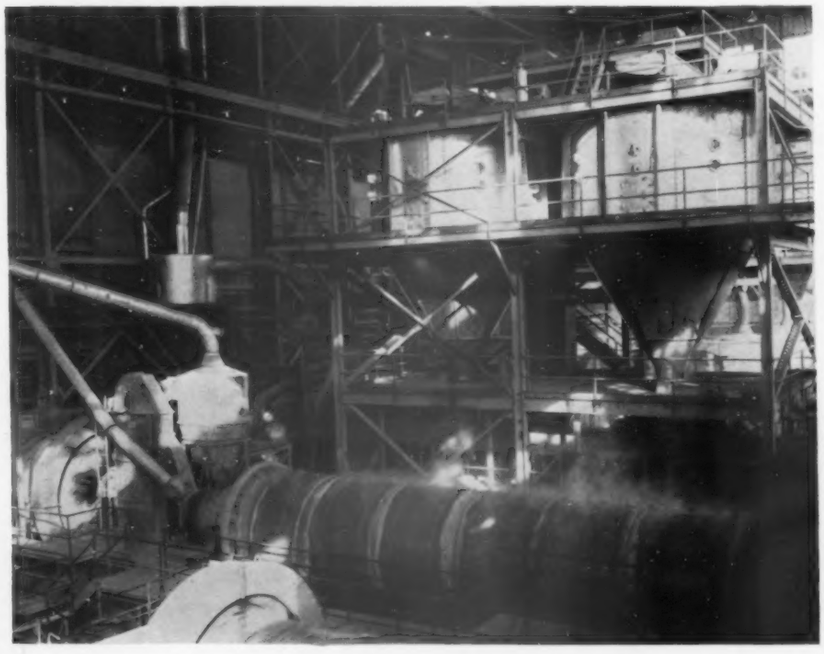


The 1,000-horsepower synchronous motor driving one of the finish mills.

A Rees dust-collecting system is connected to the clinker crushers, the storage building, the clinker-reclaiming tunnel under the storage, and the conveyor to the clinker mill-feed bins.

Clinker is reclaimed from storage by means of two Merrick Feedoweights, which are on rail-mounted carriages so that they can be moved from one compartment to another. A movable Jeffrey-Traylor vibrating feeder is also used. This arrangement makes possible any desired two- or three-way blend of clinker. These feeders discharge on reclaiming belt-conveyor *M*, which usually feeds distributing conveyor *K*, but can also feed to conveyor *L* for return to clinker storage.

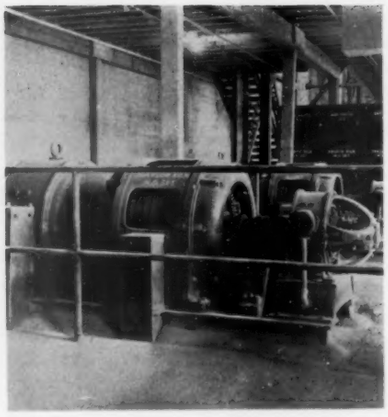
Gypsum Gypsum is purchased in pulverized form from the plant of the



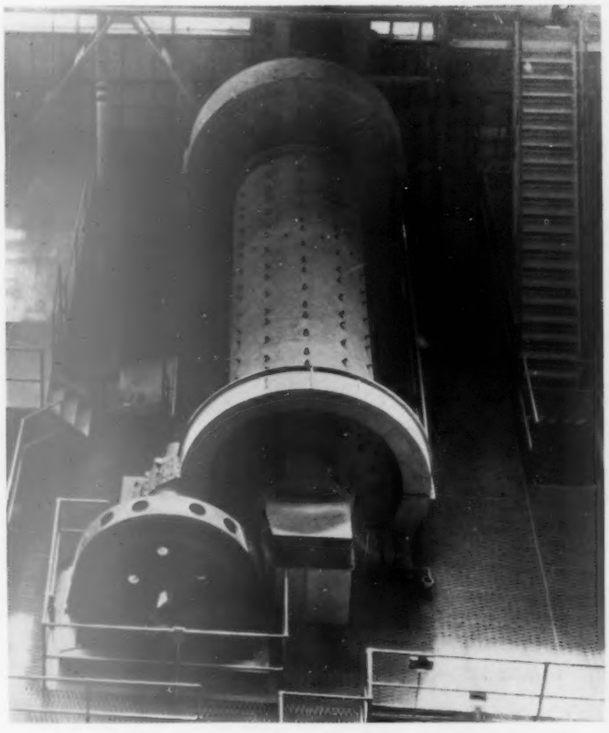
Two separators in closed circuit with new finish mill.

A group of valves under the blending tanks.

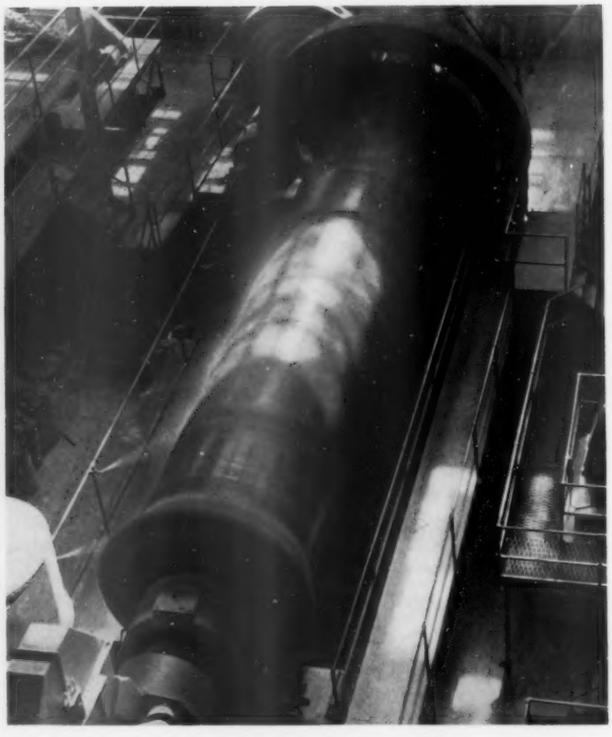
Five compressors in the mill room.



Motor-generator sets serving the kilns.



The 7- by 26-foot tube-mill in the clay-grinding department.

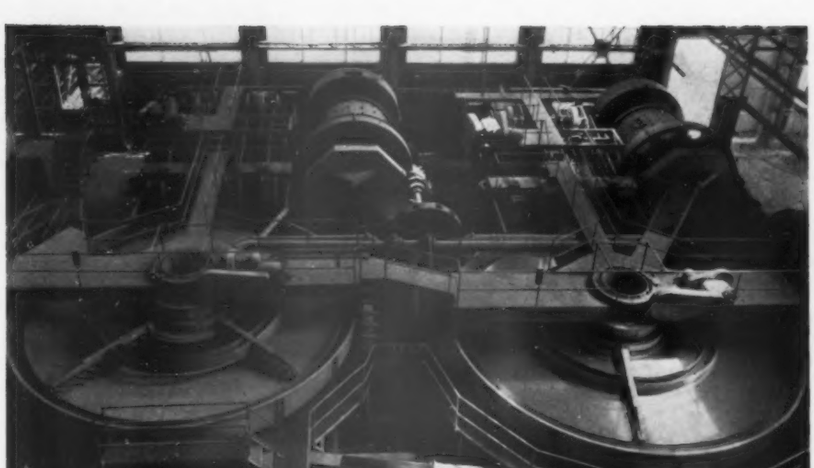


The 7- by 40-foot tube-mill in the finish-grinding department.

Two 6-inch pumps in the flotation building.

One of the slurry pumps and motor drive.

A 4-inch pump on one of the thickener arms.



The two final rawmills with sand wheels and classifiers.

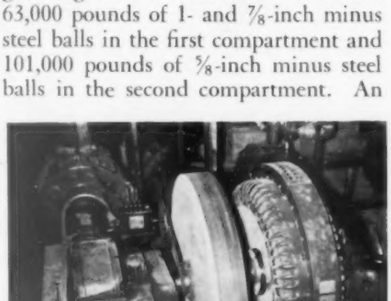
Westvaco Chlorine Products Corporation at Newark, California, where it is a by-product in the manufacture of magnesia from sea water and oyster shells. At the cement plant the gypsum is unloaded from box-cars by a Fuller-Kinyon portable unloader, which feeds either one of the 27 cement-storage silos, one of the 16 star bins, or the finish-mill feed bins. One of the two Fuller-Kinyon pumps used for reclaiming cement from these silos is used to feed gypsum from the silos to the mill-feed bins.

Any admixtures used in making certain types of cement can also be unloaded from cars into the mill-feed bins by the portable unloader.

Finish Grinding The finish-grinding department consists of three distinct systems which can be used to grind three types of cement at one time if desired. One system consists of a pair of Smidth Unidan mills, which have individual clinker and admixture bins and a common gypsum bin. The Traylor grinding system and the new Allis-Chalmers system have individual clinker bins and a common gypsum bin. Each of the four mills has two Merrick Feedoweights, one for clinker and one for gypsum, which feed screw-conveyors serving the mills. Admixtures, when used, are fed to the two Smidth mills by screw-conveyors.

Each of the two 8- by 36-foot Unidan mills is loaded with 135,000 pounds of balls and Cylpebs ranging in size from 3½ inches down. Their products are discharged into individual 6-inch Fuller-Kinyon pumps feeding a pair or Smidth 11-foot separators. The coarse material is returned to the mills. The fine products of the separators go to 9-foot diameter Smidth cyclones which release the finished cement to either of two screw-conveyors of the cement-blending screws.

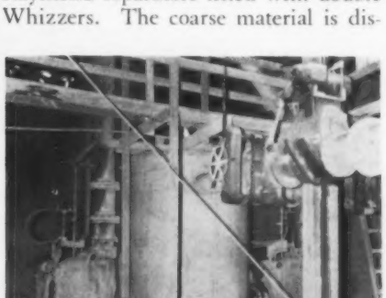
The Traylor grinding system uses a 9½- by 10-foot Preliminator ball-mill which is loaded with 61,000 pounds of 4-inch minus steel balls. A bucket-elevator feeds its product to the 8- by 40-foot Traylor two-compartment finish-grinding tube-mill which is loaded with 63,000 pounds of 1- and ⅞-inch minus steel balls in the first compartment and 101,000 pounds of ⅝-inch minus steel balls in the second compartment. An



Synchronous motor driving one of the imperial-type compressors.

8-inch Fuller-Kinyon pump feeds the product of this mill to a 6-foot diameter cyclone. A two-way screw-conveyor feeds two 16-foot Raymond separators fitted with double Whizzers. The coarse material is returned by gravity to the tube-mill or to the ball-mill or both. The finished cement is discharged from the separators into a screw-conveyor of the cement-blending system.

The new Allis-Chalmers grinding system uses a 9½- by 10½-foot Preliminator ball-mill which is loaded with 77,000 pounds of 4-inch minus steel balls. A bucket-elevator feeds the product of this mill direct to one end of the 8- by 40-foot Allis Chalmers No. 840 two-compartment center-discharge Ball-Peb mill. A screw-conveyor feeds the other end of the mill. Each compartment is loaded with 135,000 pounds of Concavex—1¼-inch minus in the first compartment, ⅝-inch minus in the second compartment. The products of the two compartments are discharged to individual bucket-elevators which feed screw-conveyors serving two 16-foot Raymond separators fitted with double Whizzers. The coarse material is dis-

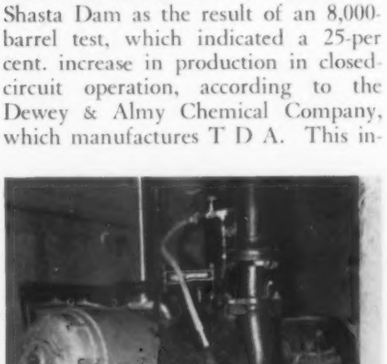


One of the slurry pumps with valves.

charged by gravity to both feed ends of the Ball-Peb mill. The finished cement from these separators is sent by a 6-inch Fuller-Kinyon pump either direct to the cement-storage silos or into either of the two screw-conveyors of the cement-blending system under the Smidth separators.

The Ball-Peb mill can also be fed at one end with the product of this compartment going to one separator. The coarse material from the separator goes by the above-mentioned screw-conveyor to the other end of the mill. The product of this compartment is elevated to the other separator and its coarse product is returned to that compartment. The fine product of each separator is finished cement and is handled in the manner described above.

T D A is being used as a grinding aid in the manufacture of cement for Shasta Dam as the result of an 8,000-barrel test, which indicated a 25-per cent. increase in production in closed-circuit operation, according to the Dewey & Almy Chemical Company, which manufactures T D A. This in-

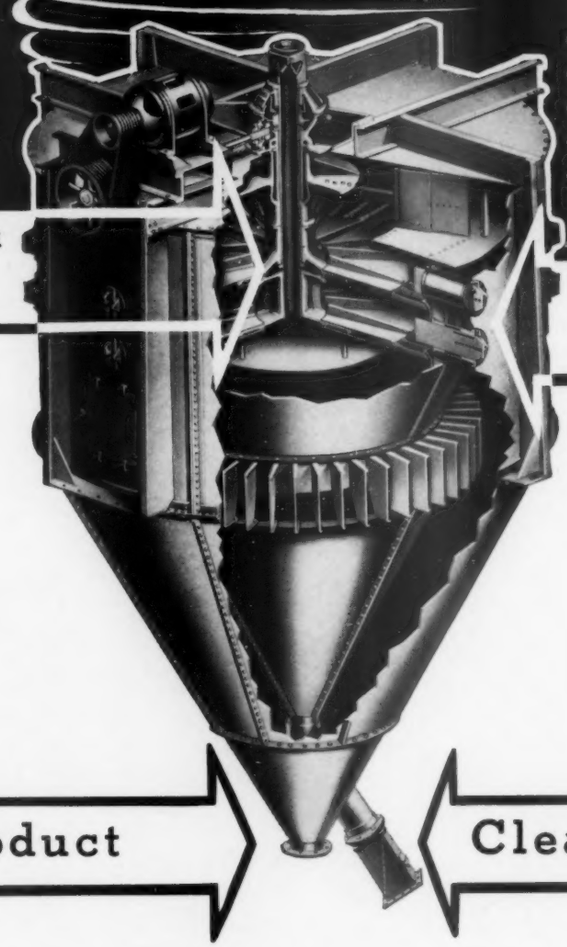


One of the pumps which feeds thickener underflow to slurry-blending tanks.

RAYMOND

DOUBLE WHIZZER Mechanical Air Separator . . .

- Center Feed Type
- Extra Large Fan
- Automatic Oiling
- Heavy Gauge Plates
- Hardened Steel Liners



DOUBLE WHIZZER revolving with center shaft

Two banks of whizzers effectively throw back the oversize, allowing free passage of fines. Result: closer selection and increased capacity.

FINENESS CONTROL by external adjustment

Moving damper plates in or out varies degree of classification. A wide range of regulation is possible without any changes inside the separator.

Uniform Product

maintained within close limits of particle size independent of changes in character of feed.

Cleaner Tailings

Remarkably free of fines, insuring high efficiency in classification, especially in de-dusting operations.

In one of the largest, recently built and modern-equipped cement plants, where several Raymond Mechanical Air Separators are operating in closed circuit with grinding mills, both standard and high early strength cements are produced. By the simple damper adjustment, any desired specific surface area can be obtained from 1800 to 3300. The flexible fineness control of the double whizzer Separator is equally valuable in classifying high grade hydrated lime to 99.5% through 325 or 400 mesh . . . chalk whiting, 99.9% minus 325 mesh . . . gypsum plaster, 90.43% passing 325-mesh . . . and many other materials. **Ask for Catalog 45.**

RAYMOND PULVERIZER DIVISION

COMBUSTION ENGINEERING COMPANY, INC.

1321 North Branch Street CHICAGO

Sales Offices in Principal Cities • • • In Canada: Combustion Engineering Corporation, Ltd., Montreal

crease in production is being maintained during the present commercial operation. The efficiency of the air-separators has also been improved. Physical tests of the T D A cement show an appreciable increase in compressive strength and durability as measured by freezing and thawing.

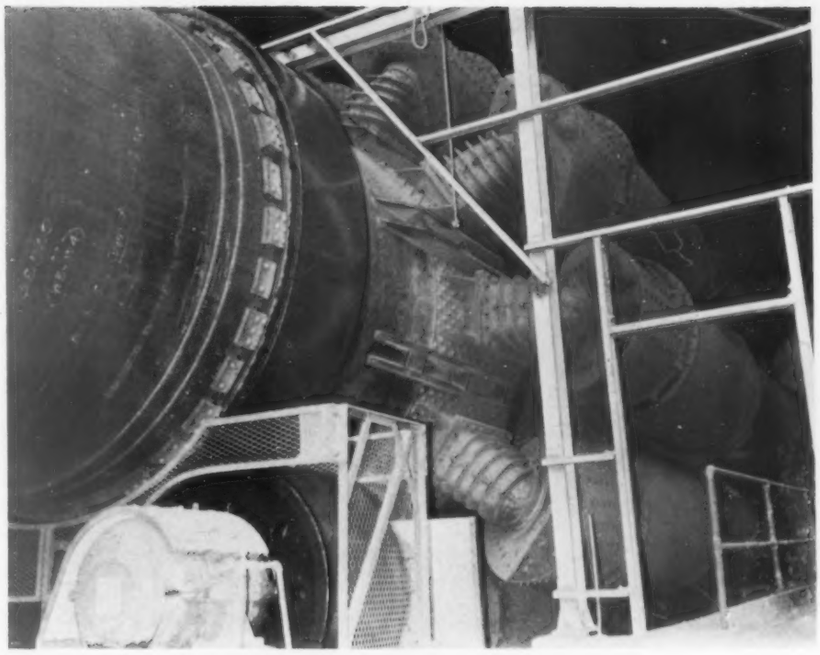
Cement Blending, Storing and Packing The cement mixing - and - blending system was installed at the request of the government to insure the greatest possible uniformity in the cement and to facilitate sampling. It consists of 12- and 16-inch screw-conveyors which carry finished cement from the separators of the three grinding circuits and discharge it into a 24-inch mixing screw feeding either or both of two 7-inch Fuller-Kinyon pumps which send the cement to the storage silos.

The cement-storage system consists of 27 reinforced-concrete 90- by 30-foot silos arranged in three rows with 16 star bins and has a total capacity of 500,000 barrels. It was built by the Rust Engineering Company. The distributing system consists of three 6-inch pipe-lines which are placed over the silos and have 2-way Fuller valves at

Burner on the 125-foot rotary lime kiln.

various points. By connecting one end of a 20-foot flexible hose to a valve and the other, by means of quick clamps, to the pipe feeding into the silo or star bin to be filled any possibility of feeding cement into the wrong silo is eliminated. If desired, the silo opening can be sealed after filling. A similar system is used under the silos to prevent loading out the wrong cement. Two Fuller dust-collectors release the air from the silos.

The two outer rows of silos are equipped with side gates through which bulk cement can be loaded by gravity into cars. About 75 per cent. of the cement in a silo can be loaded in this manner. Under the silos are three tunnels, in any one of which two 8-inch Fuller-Kinyon movable pumps can be used to feed cement from any silo or star bin. They can be used to transfer



The single-row coolers on the No. 3 kiln.

cement from one silo or bin to another or to feed bulk-loading bins or the pack-house. They are used to transfer cement from the center row of silos and the star bins to the outer rows of silos for gravity bulk-loading.

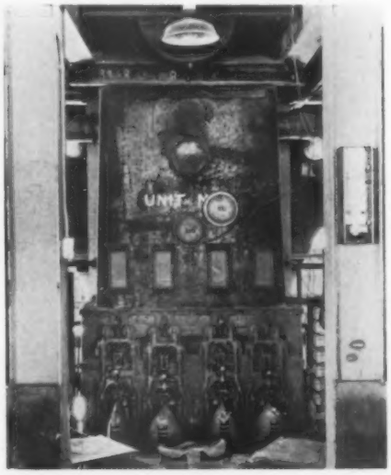
The pumps can feed cement into a 900-barrel steel bin used for loading bulk cement into trucks. Cars can be loaded in bulk from a 2-way Fuller

Pneumatic pump feeding from finish mill to air-separators.

valve on the pipe feeding this bin. A fleet of eight 100-barrel trucks is used for deliveries. These have one-piece tops which can be removed when the trucks are to be used for hauling sacked cement or other materials.

Cement for the pack-house is delivered through two 8-inch lines, either of which feeds through 5-foot diameter cyclones into any of the four 400-barrel packer-bins. Fuller-Kinyon rotary feeders supply cement to two 4-spout Bates packers. Space has been left for two more packers. Sacks of cement are discharged from each packer on Wickwire Spencer woven-wire belt-conveyors and the sacks are turned over automatically as they are discharged on a second wire-conveyor. These feed two shuttle belt-conveyors from which trucks can be loaded on either side of the pack-house. A swinging conveyor at each platform makes car-loading possible at these points also.

When cars are being loaded, the first wire-conveyors at the packers are reversed to discharge the sacks on a second conveyor on the opposite side. The sacks then drop through spiral scoops on a belt-conveyor running to a car-loading platform at one end of the building. Spilled cement is returned to the packer-feed bins by bucket-elevators.



One of the bag-packers with upper- and lower-level bin indicators above.

• Millions of dollars worth of recoverable values are being blown into the air or swooshed into sewers by American industries every year. The modern trend is against this needless waste.

• Alert plant managers turn to the Cottrell Process of Electrical Precipitation for the remedy because Cottrells have shown their amazing versatility in salvaging wastes in diverse industries.

• Who would have thought that Cottrells could recover salt cake from paper mill black liquor that formerly was wasted and polluted streams and sewers? Cottrells now save these values and at the same time abate a nuisance.

• Time was when blast furnace gas was burned uselessly at the top of the stack. Now Cottrells take out the dust and deliver clean fuel to furnaces, boilers and engines.

• Turn to tar fog in manufactured gas. Cottrells get the tar, oil and water at the same time, reduce the draft loss to almost nothing, save the by-products and cut the overall cost of purification.

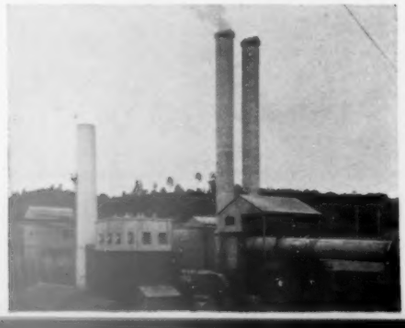
• Sulphuric acid mist used to waste itself in the air at smelters and oil refineries. Now Cottrells collect the acid and make it usable again—with no complaints from injured neighbors.

• The history of the Cottrell Process is filled with almost unbelievable performances in every industry that has problems in dust, fog, fume or mist control —for the recovery of values or the abatement of a nuisance or both.

• Take a look at your business. Are you wasting recoverable values? Is your plant clean—inside and outside? If there is any doubt about your conditions you are welcome to the full use of our comprehensive experience and exhaustive researches in all problems of dust, fog, fume and mist control.

CLEAN STACKS AT THIS COTTRELL-PROTECTED CEMENT PLANT

Cottrell Electrical Precipitators are collecting from 20 to 30 percent of total materials input as dust that would otherwise escape as a nuisance and a financial loss. Most of this material is returned to the kilns. Cottrells create good will and good profits at cement plants.



Write now for this new Booklet that briefs the amazing performance of Cottrells in recovering profits from the fog.

WESTERN PRECIPITATION CORPORATION
1016 W. NINTH ST., LOS ANGELES, CALIF. • CHRYSLER BLDG., NEW YORK
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PRECIPITATION COMPANY OF CANADA, LTD.
DOMINION SQUARE BUILDING, MONTREAL, P. Q.

COTTRELL
ELECTRICAL PRECIPITATORS

MULTICLONE
MECHANICAL COLLECTORS

The cement lines to the pack-house also serve two 400-barrel bulk truck-loading tanks in the pack-house. Two screw-conveyors feed trucks standing on the platform of a 50-ton Howe truck scale.

Laboratory As in all cement plants the heart of this one is the laboratory and control system. It is in charge of Carl M. Price, chief chemist. This department is located in a modern fireproof building near the control points in the plant and the appointments and equipment compare favorably with any in the cement industry. The equipment includes a Cook oil-well-cement thickening-rate tester, a Southwark-Emery 75,000-pound hydraulic compression tester, a Riehle briquette tensile tester, Wagner and Klein Turbidimeters, laboratory crushers and pulverizers, a jar mill, electric muffled furnaces, and the other usual equipment. There is a constant-temperature briquette storage at 150 and 180 degrees F. for oil-well cement. A constant-temperature room where 60-per cent. relative humidity and 70-degrees F. temperature are maintained is used for fineness testing, measurement of autoclave specimens, etc. A laboratory model Fagergren flotation cell is used for research work and as a check on the flotation plant.

All-steel furniture with welded Masonite tops is used throughout.

The Bureau of Standards has its own laboratory in this building with a staff of 9 men to check on all the cement produced for the Federal government.

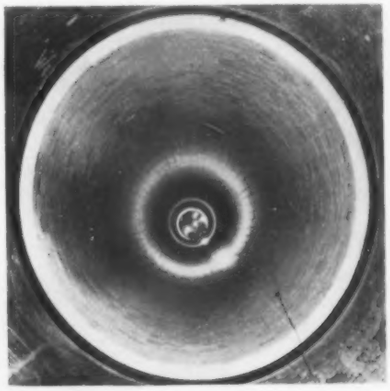
Electrical Electric power is purchased from the Pacific Gas & Electric Company at 60,000 volts and is reduced at an outdoor substation to 2,300 volts.

Base of the electric precipitators with inclosed dust-reclaiming conveyors.

Further reductions are made to 440 volts for the smaller motors and 110 volts for lights. The 2,300-volt current is used for the motors driving the mills, the two large compressors and the quarry shovel. The main switchboard and motor-generators are located in a building next the outdoor substation. Direct current is used to operate some of the kiln motors, for the excitation of the synchronous mill motors, for vibrating feeders, and for other purposes. Batteries are used to provide direct current to shut the Fuller automatic slurry valves if the regular power should fail.

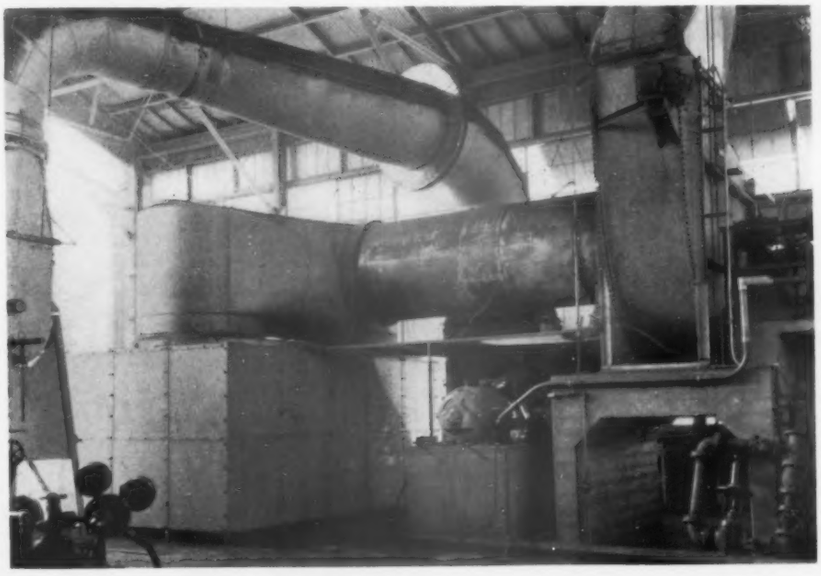
There is a 1-mile long, 2,300-volt transmission line along the conveyor system to the quarry shovel. At each conveyor transfer station is a transformer for the 440-volt conveyor motors. This and all other systems in the plant are automatically interlocked to prevent any piling up of material or damage to the equipment. For example, if a compressor stops, the pump, airlock, mill, feeder, conveyor, etc., also stop. Each must then be started by individual push buttons.

In this entire operation there are 516 electric motors with a total of 20,342 horsepower. There are 40 generators, of which 38 average 15 kilowatts, and they are used mainly for the excitation of synchronous motors. The other two are 175-kilowatts generators for the two d.-c. kiln-drive motors. The plant load seldom exceeds 10,000 kilowatts at any time.



View inside one of the kilns showing the refractory lining.

The General Electric Company supplied a large share of the motors and electrical equipment. The 121 motors furnished total 9,972 horsepower and range in size from the 1,000-horsepower synchronous finish-mill motors down to the 1/50-horsepower motors used for brush shifting on the three B.T.A. motors. Also included are 20 generators, the 2,300-volt control panel in the switch-house, the main circuit-breakers and transformers, the Ward-Leonard control of the quarry shovel, about 5,000



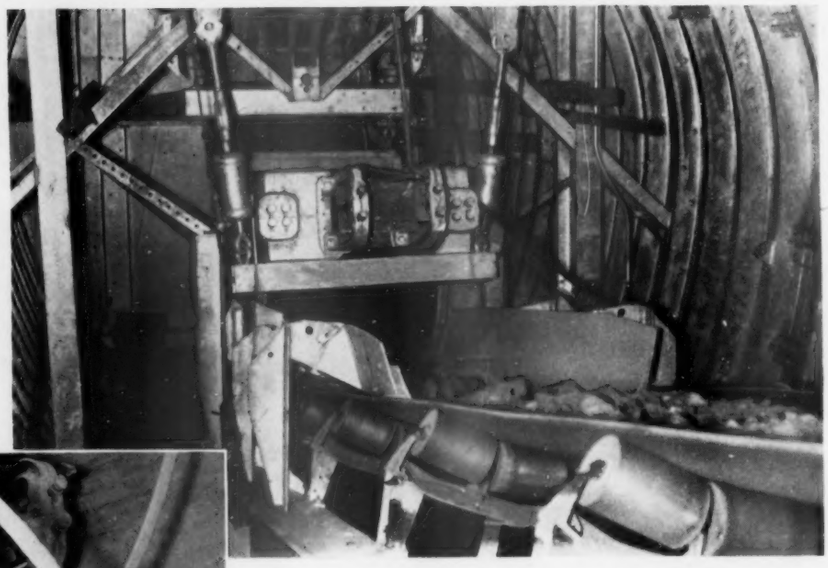
Top view of dust-collectors and fan on firing system of No. 1 kiln.

14 FEED-CONTROL UNITS

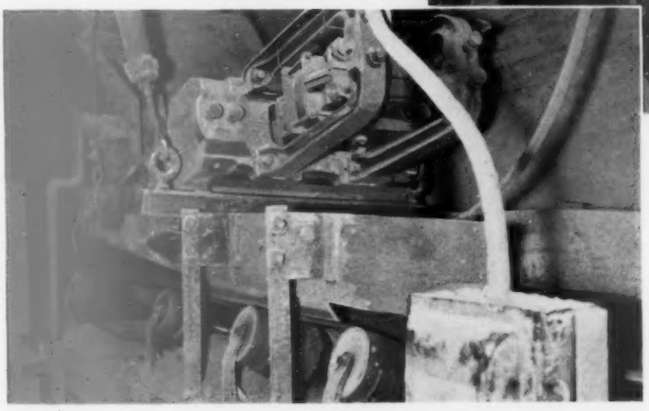
AT PERMANENTE

From quarry to finished cement Jeffrey-Traylor vibrators control the flow of solids.

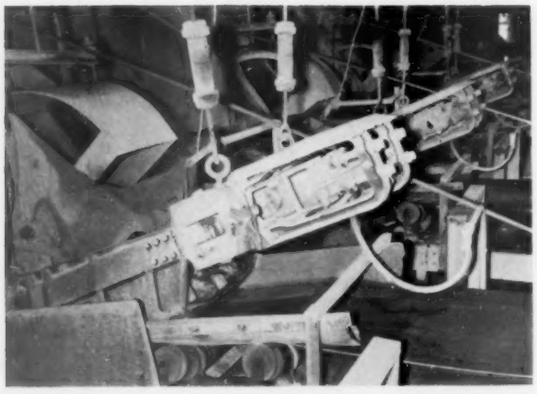
Jeffrey-Traylor electric vibrating feeders, screens, dryers, coolers and continuous weigh-feeding units . . . designed to deliver a uniform flow at controlled rate. Capacities vary with material and condition. Investigate.



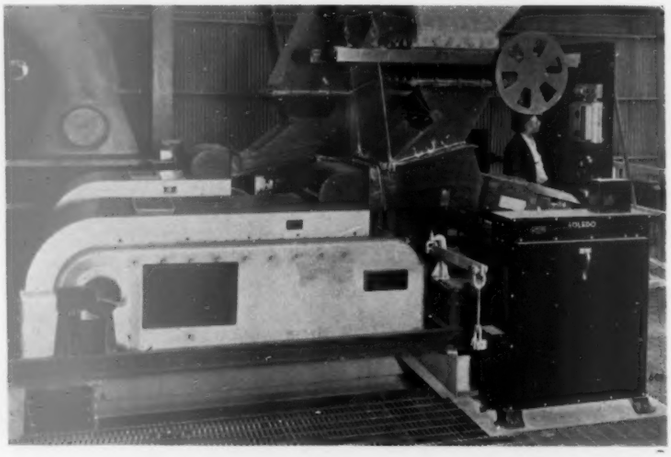
Heavy duty Jeffrey-Traylor feeder reclaiming cement rock. 500 T. P. H. from stock pile to conveyor.



Gypsum and clinker delivered to plant by Jeffrey-Traylor electric vibrating feeders. Feed rate by remote control.



Jeffrey-Traylor feeders (above) controlling feed rate for sugar rock picking tables improving efficiency of picking belt.



Left—Jeffrey-Traylor Waytrols are used extensively throughout the cement industry for proportioning by weight. May be remote controlled or controlled by demand of grinding unit.

Catalog No. 650-M completely describes and pictures Jeffrey-Traylor electric vibrating units—send for your copy.

THE JEFFREY MANUFACTURING CO.

917-99 North Fourth St. **Columbus, Ohio**

feet of 2,300-volt cable for this shovel, a Diesel-electric locomotive, and other equipment.

U. S. Electrical Motors, Inc., supplied 259 motors totaling 7,441 horsepower and ranging in size from ½ to 200 horsepower. All are ball-bearing and asbestos-protected. Of these motors, 100 are U. S. Syncrogear gearmotors and 22 are U. S. Varidrive Syncrogear motors. The latter are variable-speed units with variable-pitch pulleys and belts and are used to operate feeders, hydroseparators, picking belts, etc.

The Westinghouse Electric & Manufacturing Company supplied 50 motors totaling 3,102 horsepower and ranging from ¼ to 300 horsepower in size. Other equipment furnished includes 5 generators, two for the d.-c. kiln motors, all the main breakers in the 440-volt control-panel in the substation, most of the 440-volt distributing panels throughout the plant, and other equipment.

Most of the feeder and other large wires were supplied by the Okonite Company. Johns-Manville asbestos-cement Korduct was used for underground ducts. Fast flexible couplings are used on many of the drives.

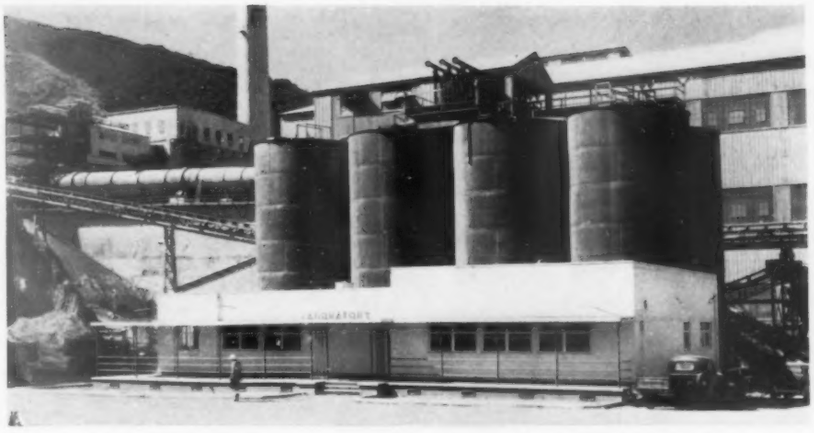
Air and Water Air for all the Fuller-Kinyon pumps is supplied by individual Fuller rotary compressors located near the point of use. The compressors for the pumps in the mill-room are located there. Those for the two pumps under the silos are in a building alongside the silos. Three Ingersoll-Rand Imperial Type 10 compressors, which are rated at 1,100 cubic feet per minute each and supply air for agitation and other purposes in the plant, are located in the mill-room.

Fresh water for use in the plant is purchased from the Suburban Water Company and is supplemented from a large settling pond near the plant. Eight Byron-Jackson pumps supply water to various departments.

All the conveyor belting used in this plant was supplied by the Goodyear Tire & Rubber Company. The Chain Belt Company supplied all the conveyor idlers, some of the head and take-up pulleys and all the spray nozzles on the screens. Timken anti-friction bearings are used throughout. Gates V-belt drives are used to a large extent. The Union Oil Company supplies all the oil and grease.

A total of over 250 Walworth slurry valves of the plug type are used in the plant. These range from 1½ to 12 inches in size. This company also furnished many of the water valves and fittings and much of the pipe used in this plant.

Many miscellaneous pieces of equipment are used about the plant and property to handle materials, maintain roadways, keep the property clean, and for other purposes. These include small shovels, loaders, tractors, trucks,



The laboratory building with slurry-blending tanks in background.

Interior of physical-testing laboratory with flotation testing machine, oil-well cement tester, briquette breaker, and compression tester.

A view inside the constant-temperature room.

The chemical-testing laboratory.

MERRICK Feedoweight feeding clinker to one of the raw mills.

MERRICK Weightometer which weighs all quarried rock, in quarry reclaiming tunnel.

MERRICK at Permanente

Weighing Quarry Rock

MERRICK is doing a big job of weighing in the giant new Permanente plant near Los Altos, California. Cement for Shasta Dam is produced at this plant. A MERRICK Weightometer operating over a belt conveyor weighs and records all the rock passing from the quarry to the plant. It also automatically controls the gate to the pan feeder, insuring an even feed.

Feeding Clinker and Gypsum

Each of Permanente's four finish-grinding mills has two MERRICK Feedoweights, one for clinker and one for gypsum, which feed screw conveyors supplying the mills. Two similar Feedoweights feed the primary raw grinding ball mills. Also, clinker is reclaimed from storage by means of two MERRICK Feedoweights, mounted on rail-carriages for portability.

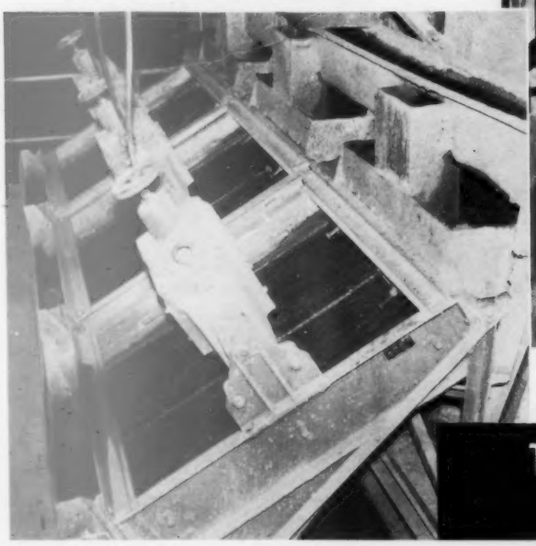
Write for Bulletin

MERRICK SCALE MFG. CO.
PASSAIC NEW JERSEY

TYLER SCREENS PROVE EFFICIENCY FOR WIDE RANGE OF SIZING PROBLEMS AT PERMANENTE

TY-ROCK SCREENS for
dependable low cost operation on
Crushed Stone, Cement Rock, Sugar Rock

HUM-MER SCREENS
provide accurate sizing of
Clay Slip at 60 Mesh Separation



THE W. S. TYLER COMPANY
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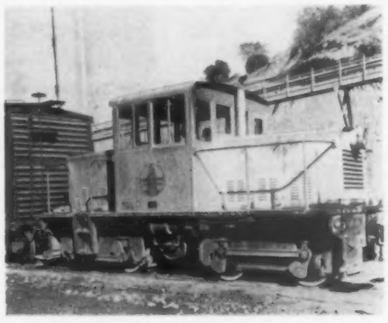
etc. Most of the switching of cars is done by a General Electric 300-horsepower Diesel-electric locomotive. A small Davenport locomotive is also used for this work.

The Rees Blow Pipe Manufacturing Company, San Francisco, supplied most



Diesel-electric locomotive used for switching.

of the dust-collectors used in this plant. Rees cloth-bag collectors are connected to the Smidth and Traylor finish-mill circuits, the clinker-handling equipment, the crushing department, the pack-house and other points. A total of approximately 70,000 cubic feet of air per minute is handled by these collectors. A Norblo collector serves the new finish-mill circuit.

Two Fuller Company cloth-bag collectors on the tops of the cement silos release air from the system.

All the workers in the quarry and other exposed places wear B. F. McDonald Type F safety hats.

Sugar-Rock Production Sugar rock is withdrawn from its 100,000 ton stock-pile by a Jeffrey-Traylor vibrating feeder and is discharged on conveyor *N*. This is followed by conveyor *O1*, which feeds the rock to a 4- by 8-feet Screen Equipment Company "Seco" screen. Any part of, or all, the stone from the cement-rock crushing plant can also be fed to conveyor *O1*, or to conveyors *F2* and *F3*. Only one deck of this screen is now being used to remove degradation from the sugar rock. The oversize from this screen goes to conveyor *O2* from which a Bodinson automatic traveling tripper discharges it into eight of the ten compartments of the 1,000-ton bin over the sugar-rock plant. Eight Jeffrey-Traylor vibrating feeders supply rock to the same number of 30-inch by 20-foot picking belts which have variable-speed drives. From one to three pickers may work on each belt, depending on the grade of rock desired.

The material picked out of the sugar rock is dropped through hoppers on conveyors *S*, which carries it to the commercial crushed-stone plant. This conveyor also receives the degradation from the above-mentioned screen and, if desired, all the rock from conveyor *O1* can be fed by this conveyor to the crushed-stone plant.

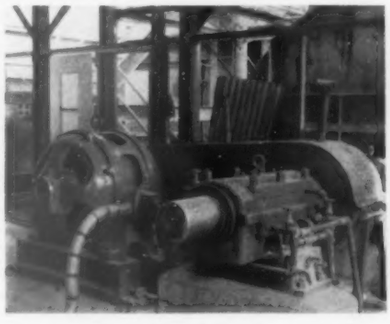
The picked-over sugar rock is carried on conveyor *Q* to a Ty-Rock 5- by 10-foot 2-deck washing screen with 2½- and ¼-inch openings. The 2½- to ¼-inch rock is carried on conveyor *R* to the 27,000-ton lime-plant stock-pile.

Sugar rock passing over the top deck of this screen is discharged into a 200-ton cylindrical steel bin. Rock withdrawn from this bin for loading is discharged over a Seco 4- by 8-foot 1-deck screen for rewashing before it is loaded into cars by conveyor *U*.

The fine material passing through both the washing screens goes to a sump, from which a 3-inch Wilfley pump feeds it to the sand-classifier in the crushed-stone plant.

Crushed-Stone Production As already explained, the system for feeding the commercial crushed-stone plant is the last word in flexibility. Any number of possible combinations are available for using in this plant any waste, oversize, undersize or other material from the cement-rock or sugar-rock plants. The rock fed to this plant on conveyor *S* goes first to a 4-foot Symons shorthead cone crusher. A conveyor, *F4*, carries the crushed rock to the top of the plant, where it is discharged on a 5- by 12-foot Ty-Rock 2-deck screen for making coarse sizes. Material passing through the bottom deck goes to a duplicate screen for fine sizing. The openings used on these screens are changed to meet requirements, as is also the opening of the cone crusher.

Sand from the second screen and from the sugar-rock washing screens described above goes into a Bodinson rake classifier. The finished stone sand drops from the classifier into one of



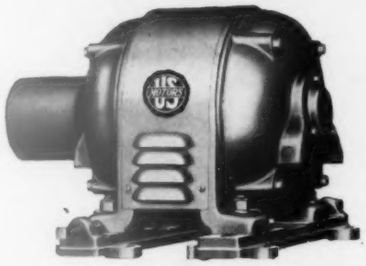
Motor and silent-chain drive for induced-draft fans at feed end of kilns.

the four 300-ton radial compartments of one of the two cylindrical steel loading bins. The other compartments are used to store the other products, which run in size up to railroad ballast. If desired, this plant can be used for shipping quarry-run rock, and dust can be produced by running the screens dry. Chain Belt Rex sprays are used on these and all the other washing screens in these operations. Under the bins is a 4- by 5-foot Allis-Chalmers 1-deck washing screen which can be used for rewashing if desired. Ordinarily products are discharged from the bins direct on a shuttle belt-conveyor *F5*, which loads cars or trucks. The overflow from the classifier is transferred by a 5-inch Wilfley pump to the settling pond from which all plant water is obtained.

Lime Production Stone for the lime plant is drawn from its 27,000-ton stock-pile by belt-conveyor *V* in a concrete tunnel under the stock-pile. This feeds a Traylor 4-foot "Bulldog" crusher for reduction to 1⅝ inches and under. Conveyor *W* takes the stone to the kiln-feed building, where it is discharged on a 4- by 10-foot Seco 2-deck screen with 1⅝- and ⅝-inch openings. The 1⅝- to ⅝-inch rock is discharged into a 100-ton concrete lime-kiln feed bin. The two larger and smaller products drop into two of the three 100-ton concrete truck-loading bins. The third bin is used for reclaimed kiln dust. All these materials are sold commercially.

Under the lime-kiln feed bin is a Link-Belt unit pan-feeder which supplies stone to the 8- by 125-foot rotary kiln. The kiln is driven by a 25-horsepower Westinghouse wound-rotor motor with a Synchrotie synchronizing hook-up between the kiln and feeder motors. The kiln is fired with gas and has Coen auxiliary oil-burners. The kiln gases are drawn by a fan through a Western Precipitation Corporation dual Polyclone dust-collector, from which the dust is transferred by a screw-conveyor and an elevator to the truck-loading bin described above. The air and gases are exhausted to a stack.

The calcined lime is discharged from the kiln into a 5- by 50-foot Joshua Hendy rotary cooler equipped with lifters for part of its length. A Link-Belt automatic skip-hoist with a 20-cubic foot bucket feeds the lump lime into either of two 5,400-barrel circular steel bins with conical bottoms. Link-Belt 18-inch pan-feeders are used to withdraw lime from these bins to two 2- by 6-foot Seco Type J 2-deck screens equipped with ⅜-inch openings and pans. The oversize goes on a 30-inch by 92-foot picking conveyor for direct loading to cars or trucks as lump lime. The "throughs" and "rejects" go to an 18-inch by 44-foot belt followed by an 18-inch by 9⅓ foot belt from which trucks are loaded.



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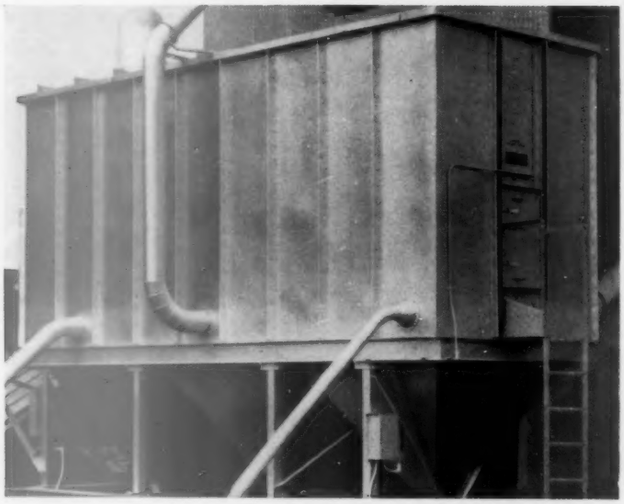

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Bethlehem Steel Studies Performance of Wire Rope at Bridgeport Quarry

AT its crushed-stone plant at Bridgeport, Pennsylvania the Bethlehem Steel Company has made some interesting studies of wire rope performance. For loading blasted rock into a dump truck for haulage to a skip-hoist it uses a 3½-cubic yard 120-B Bucyrus-Erie shovel equipped with 1½-inch O6/41 cable having an independent wire-rope center. The cable is 190 feet in length, although only 178 feet is required to reeve the power shovel falls. The object of the difference between the cut length and the operating length is to provide 12 extra feet in the new line for future shortening. Although this feature of rope replacement has not been thoroughly tried, an examination on May 1 of this year indicated that the useful life of the cable will be materially lengthened. On this date the new cable had served during the removal of 66,000 tons of material and the inspection disclosed that it was good for many more tons before shortening would be required. The main point of wear is at an equalizer sheave in the center of the cable. By cutting 6 feet from one end of the cable on two separate occasions the point of wear is changed twice and the life of the cable prolonged.

This shovel is interesting from the standpoint of wire-rope service since a complete record of the number of tons of material handled by each rope was kept from the time of its purchase. The first rope used was 6/29 with an independent wire-rope center 7/7 and served during the handling of 181,069 tons of material.

The next three ropes failed to equal the service of the first rope by 50 per cent. or more in that they handled 92,115 tons, 69,962 tons and 69,822 tons respectively.

The life of any wire rope depends to a considerable extent on the care given it during operations. A careless shovel operator can quickly ruin a rope, and a careful operator can get many tons more service out of a rope which, to the casual observer, appears to be worn out. Many accidents occur to wire ropes on shovels as they must work close to the rock face from which, not infrequently, rocks fall from great heights. Should a rock fall on a cable which is taut, the crown wires are likely to be cut and twisted over so that they lie across other wires, resulting in further injury to the rope when passing around the sheave. The shovel may be swung too far outward, striking a rock with the rope and causing injury. Rocks often fall into the sheaves and cause abrasion. The operator of the machine is always expected to be on the look-out for these and other irregularities which may reduce the working life of the rope.

The power shovel picking up stone at the base of the ledge.

Close-up view of the shovel showing where the wire rope is subject to considerable damage.

The 10-ton skip which elevates the rock to the surface.

Lubrication constitutes an important phase of wire-rope maintenance. The Bethlehem company's master mechanic, having the care and responsibility of many shovels, was asked to give his method of procedure relative to maintenance of his wire ropes.

"We thoroughly clean all our ropes twice each year, where they last longer than this period," he said. "Following the cleaning, which takes two men approximately a full day, we give them a treatment of Texaco Crater Compound No. 0. In addition to this we equip each one of our cranes with an oiler at the head sheave. We drip these oilers so that about one quart of black oil is fed to the rope each week. The fine dust of the quarry seems to affect the rope material. By keeping the ropes well oiled we find that the oil absorbs the dust or *vice versa* and the brittleness does not occur as readily."

The rock is loaded into trucks which dump directly into a 10-ton skip hoist. It is hoisted to the crusher by the 170-foot skip, which is equipped with 450 feet of 1¾-inch diameter 6/19 wire rope with a hemp center. This hoist has a speed of 500 feet per minute. The angle of slope of the hoist is 45 degrees and the total height through which the skip is raised is 125 feet.

A stiff-leg crane, set on a ledge of rock overlooking the quarry near one end, is provided with 2,400 feet of ¾-inch 6/19 wire rope. It is used to raise or lower material to the quarry floor. There are six sheaves on the boom and hoist, providing 13 strands of rope. An electrically-driven winch operates the crane.

A Bay City crane mounted on a White truck is fitted with a ¾-cubic yard bucket and is reeved with 117 feet of ⅝-inch 6/19 wire rope. A 40-ton load of rock can be placed in a gondola car in less than 30 minutes without the aid of any labor aside from the crane operator. The net cost for loading is between 10 and 15 cents per ton including depreciation, taxes, insurance, fuel, maintenance and operating labor. Being mounted on a truck, the crane can be quickly moved, in fact, it took the crane exactly 15 minutes to move a distance of about 200 yards and start work on another pile of rock.

The life of wire rope on this crane is indefinite, as the record was not clear due to the fact it moves about so often that it is difficult to keep count of the tonnage handled. The master mechanic

said, however, that on similar cranes new ropes were reeved in once a year. The maximum wear comes at the bucket-closing sheaves. It is common practice in some quarries to move the

The stiff-leg crane used for lowering equipment into the quarry.

Crane loading crushed stone into railroad car.

Close-up view of the loaded bucket showing where the wire rope is subject to considerable wear as it passes around the closing sheaves.

rope endwise by cutting away about 6 feet occasionally to prolong its life. However, it is questionable whether this saves the rope appreciably except when the rope has suffered injury at this point. If the change is due to normal wear the entire rope is, very likely, worn and in need of replacement.

Cement Statistics Reveal Gains

According to a final statistical summary released recently by the Bureau of Mines, the output of 122,259,154 barrels of Portland cement in 1939 — an increase of 16 per cent. from 1938— was the highest recorded since 1931 but represented a decrease of nearly 31 per cent. from the record high production of 1928.

Shipments of Portland cement from mills in 1939 amounted to 122,651,459 barrels valued at $180,893,208, an increase of 15 per cent. in quantity and 17 per cent. in gross value. The average factory price per barrel in bulk in 1939 was $1.47, an increase of 2 cents per barrel as compared with 1938.

Producers' stocks at the mills on December 31, 1939—23,600,634 barrels—showed a decrease of 2 per cent. from those at the end of 1938.

Data from reports of the producers, show that 79.9 per cent. of the mill shipments in 1939 were moved by railroad; 13.4 per cent. by truck and 2.1 per cent. by boat; (for the remaining 4.6 per cent., the carrier was not stated); 19.7 per cent. of the shipments was by bulk (loose cement); 42.7 per cent. in paper bags; 33.8 per cent. in cloth bags; 0.1 per cent. in other containers; and 3.7 per cent. was unspecified.

As compiled from monthly estimates of the cement producers, supplemented by a few estimates by the Bureau of Mines, the following quantities of fuel were consumed at the Portland cement plants of the United States in 1939 as compared with the production of 121,934,911 barrels of finished cement and 121,620,000 barrels of clinker (unground cement): coal, 5,227,756 short tons; oil, 2,378,762 barrels (42 gallons); and natural gas, 40,233,089,789 cubic feet. In addition to the foregoing fuels, 5 plants reported the use of petroleum coke with other fuels.

From reports of the producers the electricity used in the industry in 1939 totaled 2,781,059,626 k.w.h., of which 50.1 per cent. was purchased and 49.9 per cent. generated at the plants. At 27 plants in 1939 all the power used was generated at the plant.

The commercial capacity for production of finished Portland cement of the 151 shipping plants in 1939 and of 12 plants inactive in 1939 but producing within the seven previous years, according to manufacturers' reports supplemented by a few estimates was 256,422,000 barrels. The figures include the capacity of two new plants (wet process) located in California and Puerto Rico, respectively, that began producing in 1939. The total production for 1939 was 47.7 per cent. of the indicated capacity at the close of the year; the corresponding figure for 1938 was 41.2 per cent.

Beware Tendency of Rope to Curl

The life of ropes used on slope hoists in quarry pits is affected by the presence of any tendency of the rope to curl or to loop, which may cause kinks and may affect the evenness of wrapping on the drum, says Lloyd Cannon, manager of the fullers' earth quarry of the Sinclair Refining Company, at Olmsted, Illinois. A rope that lies straight, even when slack, is less apt to run off the guide rollers, and thereby save itself from being damaged when being installed than one that is "snaky" and is hard to control, Mr. Cannon pointed out.

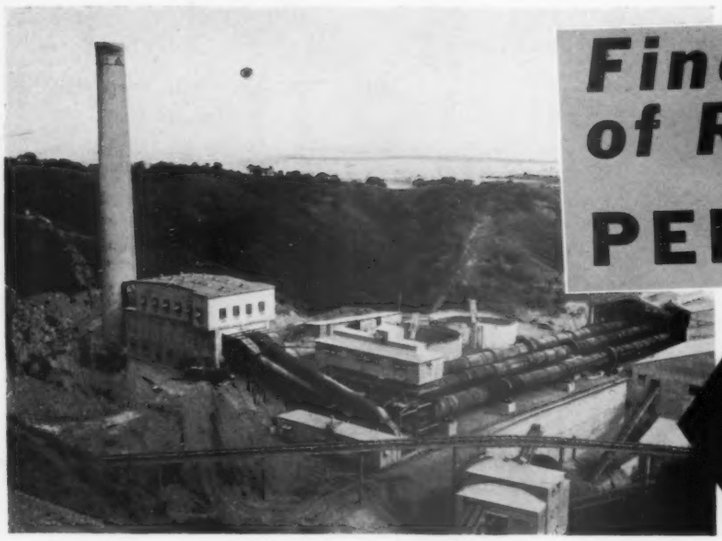
Because it runs straight, does not tend to twist or loop, and is easily handled when being installed or being removed, preformed rope is being used at this quarry for slope haulage. This rope is giving an average service of 9 months, or about 1,575 hours, says Mr. Cannon. It is ¾ inch in diameter, preformed, 6 by 19 filler-wire construction, with hemp center, and is 1,500 feet long.

Despite the best of care and watchfulness, rope breakage sometimes occurs. This is not so serious a matter with preformed rope as with non-preformed, since the broken ends of the preformed rope do not tend to ravel and unlay, thereby allowing almost all the rope to be salvaged for other use, or to be spliced.

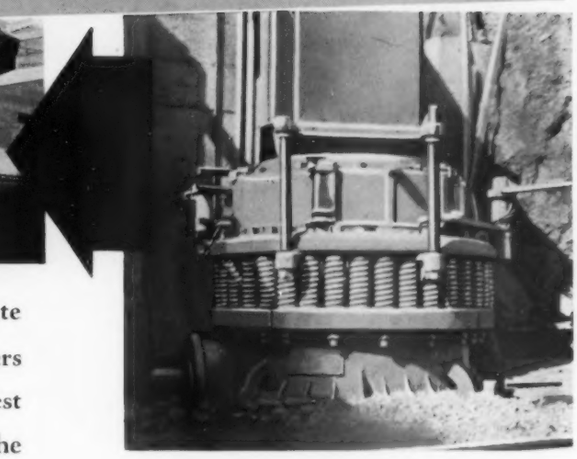
The greatest wear on this haulage rope occurs along a length of 18 to 20 feet, about 10 feet from the load end. Here is where the most severe abrasion from dragging occurs. The ends of the rope are occasionally reversed, thereby transferring the resultant localized wear to another part of the rope.

Occasionally breakage occurs at this point. When a temporary repair is necessary, the broken end is spliced to the drum end of the rope, where it will not be subjected to maximum tension.

These slope ropes, when discarded, are used as hoist ropes on the shovel in the quarry pit, and for other purposes where their diameter fits the sheaves and drums.—*F. E. Spangler, M. E.*



Finer Crushing of Raw Material at PERMANENTE



Another 4 foot Symons Cone Crusher like this is installed at Permanente.

Here in the new modern plant of the Permanente Cement Corporation, two 4 foot Symons Cone Crushers are doing fine crushing. This is the country's newest cement plant and, as is expected, its equipment is the most efficient and economical that is available today. One of these Cones is used for crushing raw material, taking a six inch feed and reducing it to a minus half inch product. The other Cone is in the aggregate plant reducing limestone from a six inch feed to a three-quarter inch product.

Whether crushing raw material or clinker, the ability of the Symons Cone to crush much finer and in greater capacity makes it the ideal crusher for cement mill service. Where Symons Cones are making mill feed at cement plants and mines, it has been definitely proven that finer crushing materially reduces the overall cost of crushing and grinding. Finer crushed mill feed has the further advantages of increased capacity, lower power demands, decreased liner wear and ball consumption. These advantages are factors in attaining lower costs and increased operating profits.

Symons Cones for cement mill service range in sizes from the smallest having a crushing head of two feet to the largest with a head of seven feet.

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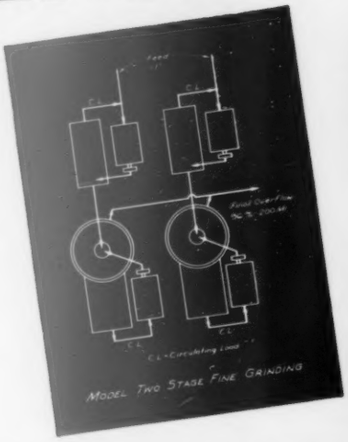
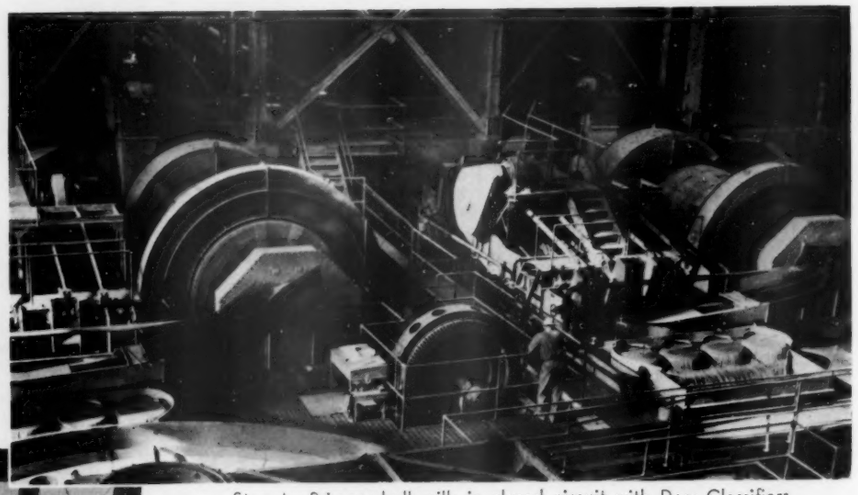
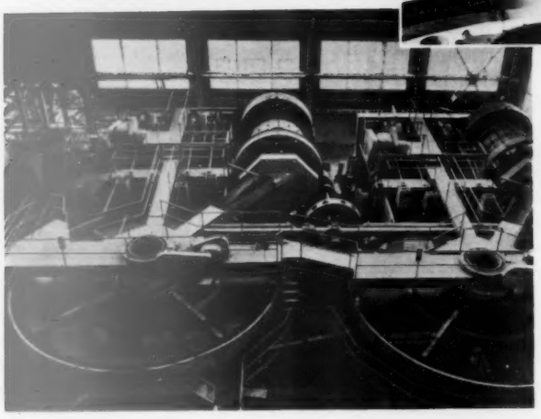




Step 1—Primary ball mills in closed circuit with Dorr Classifiers



Step 2—Secondary ball mills in closed circuit with Dorr Bowl Classifiers

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Progress or Decadence in the Lime Industry?

By "ONLOOKER"

YOUR writer, "Calx," in this article, "Obsolescence in the Lime Industry," appearing in the August, 1940, issue of PIT AND QUARRY, has aptly presented a word description of an industry practically lost in the maelstrom of modern scientific industrial progress.

Here is an industry rich in historic background, its products in use for centuries and in a myriad of processes; a basic commodity of vast value and service to mankind. Its worth to mankind is briefly and inadequately described at times as the ABC of Industry, because lime is finding an ever-growing demand in the agricultural, building and chemical industries—this despite the encroachment of competitive products in all three fields.

It has often been said that a given product finds its greatest competition from a source remotely, if at all, related to the product or device in question. While this holds true to some extent with respect to lime, yet there appears to be a more potent and sinister influence from within, affecting the welfare of the numerous units of the lime industry. This influence—a fifth columnist, so to speak—has been growing constantly over a period of many years, until it has reached cancerous proportions; a stage at which mortality reaches into the high figures.

What is this influence? Does it show signs of being abated or thwarted? On the contrary, it appears to be reaching a contagious condition. It was born before the great depression No. 1, aided and abetted by depression No. 2, and nurtured by the improvement of business in general since 1937. This rabid influence appears to be "Old Man Indifference." It is an indifference to existing conditions—a lack of fighting spirit to surmount the many problems confronting the industry.

To prove my point, I have resorted to some statistics for the industry, which will illustrate the progress, or otherwise, in our bakeshop, according to the individual status of each unit now operating on a "for profit" basis. The production in short tons, the number of plants in operation and the net value of the product are given below, obtained from publications of the U. S. Bureau of Mines. The statistics are shown for the period 1920 to 1939 inclusive to illustrate the progress(?) made by the lime industry in two decades of operation; through lean years and lush.

YEAR	PLANTS	TONS	VALUE	AVERAGE PER TON
1920	515	3,570,141	$37,543,840	$10.52
1921	520	2,532,153	24,895,370	9.83
1922	530	3,639,617	33,255,039	9.14
1923	467	4,076,243	39,993,652	9.81
1924	450	4,072,000	39,596,423	9.72
1925	450	4,580,823	42,609,141	9.30
1926	435	4,560,398	41,566,452	9.11
1927	417	4,414,932	38,638,413	8.75
1928	411	4,458,412	36,449,635	8.18
1929	381	4,269,768	33,478,848	7.84
1930	375	3,387,880	25,616,486	7.56
1931	345	2,707,614	18,674,913	6.90
1932	343	1,959,990	12,302,231	6.28
1933	332	2,269,280	14,253,659	6.28
1934	324	2,397,087	17,164,024	7.16
1935	301	2,987,133	21,748,655	7.28
1936	301	3,749,383	26,933,719	7.18
1937	314	4,124,165	30,091,168	7.30
1938	321	3,346,954	24,137,638	7.21
1939	311	4,254,348	30,049,394	7.06

The progress is questioned for the reason that one of the prime factors involved is the prospect of profit on the capital investment. Profit in the lime industry, if we can accept the facts as presented by past performance, seems to be the exception rather than the rule, and therein perhaps lies one of the reasons for the industry being in the unenviable position it finds itself in today.

"Calx" describes the progress made by some plants in respect to burning; the efficiency obtained by rotary-kiln operation; the low cost per ton of lime produced; and ably continues his treatise in the September issue of this publication. However, is it not true that such progress is unfortunately confined to a few isolated instances and does not reflect united action of the industry as a whole?

The unfortunate feature of lime burning is that the kilns, no matter how old or obsolete, continue to produce lime if of uncertain quality or otherwise, and in variable quantities in relation to the amount of fuel consumed. The original investment charges have been written down, replacements may have been made, but lime burning is continued with little if any incentive or desire to carry on operations looking to technological progress. The decrease in the number of active plants producing and the average price per ton of lime at the kilns during the past twenty years, as indicated above, speaks volumes reflecting unfavorably on conditions in the industry. Note the trend and the drop in the value per ton of lime sold; and this in the face of almost vertical increases in fuel, labor costs, taxes and materials used in the marketing of lime products.

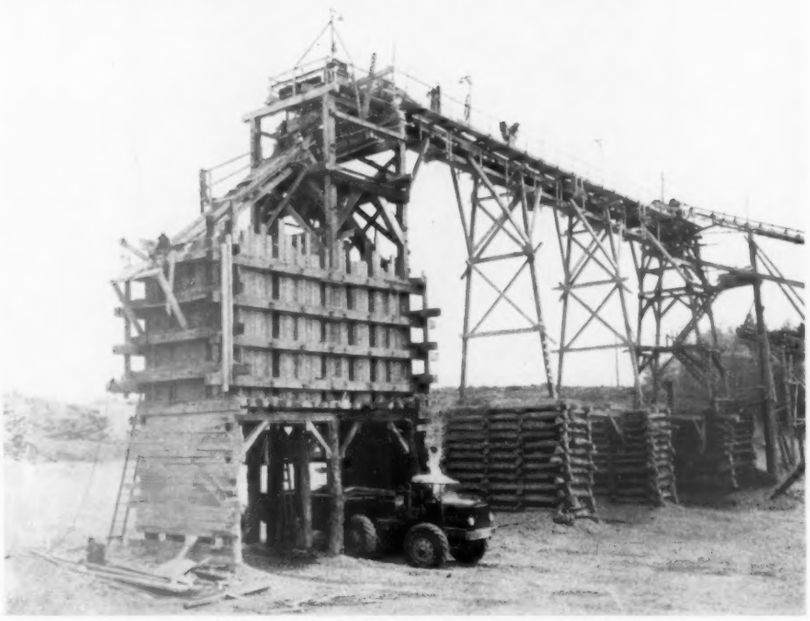
Improvement can not be obtained by simply increasing the selling price of the commodity, altering wage scales, or by some similar expedient. It requires a whole-hearted spirit of action by the entire industry. This can be accomplished by a firm, if somewhat revolutionary, industry-wide determination to pull itself together, to stand up eye to eye, with a faith and courage which will determine once and for all that the lime-burning fraternity is as one, knows its important, if latent, position in industry, and demands, and is determined to secure for itself, respect among the individual members and of the trades which it serves so well.

It is not enough to figure investment, the cost of manufacture, depletion, depreciation, taxes and selling costs. Lime accounting should rightfully include these charges, but should also include charges for reserves, obsolescence and research or development costs. It should likewise include a fair selling price to insure a normal profit. Such charges should be made faithfully and backed by a well-planned and managed policy that will guarantee the use of the funds allocated for the purpose intended.

Individual plants or groups of plants should organize to form a research bureau or corporation to secure an improved product, to extend its uses, and include a study of manufacturing processes. It should study the utilization of by-products and the development of allied products in which lime is a basic or component factor. It would result in diversification and, too, be the means of increasing the dollar values of the industry's products. The industry should finance and encourage technical research, not merely sporadic, but sustained long-range research. This has been attempted by national and district association activities in the past and I am sure much has been accomplished in spite of the limited support given such efforts. Perhaps this might be attributed to the fact that the support of such work has been limited to certain regional plants instead of taking the form of industry-wide coöperation, but the point is that whether it is done by national or regional associations, group or individual action, research of an earnest nature, backed by adequate financing, is and should be the key note of an industry plan of rehabilitation.

A plan of accomplishment of this kind can not be prosecuted by mere words or hopeful wishing. It must be accomplished by deeds of good faith; faith in one's fellow manufacturers; faith in the future of the industry. It means an acceptance of the younger generation of technicians, of whom

(Continued on page 68)



These three views illustrate the use of the 12-cubic yard bottom-dump Diesel tractor-trailers at the plant and deposit operated by the Coleman Brothers Corporation to serve the Franklin Falls flood-control dam project.

OVERSHADOWED by the many larger projects under construction, but just as important to the communities they serve, are the many flood-control dams being built in various parts of the country. These projects receive comparatively little publicity and many persons, even in the engineering fraternity, would be surprised to know that several medium- and large-sized dams are now under construction in New Hampshire and Vermont. This section has from time to time suffered severe losses of life and property from the flooding of its many mountain-fed rivers and tributaries. One flood alone on the Pemigewasset River in the winter of 1936-1937 caused damage totalling millions of dollars. This river has its head water in the foothills of the famous White Mountains of New Hampshire and flows into the Merrimack River which goes on south through rich resort and manufacturing districts on its way to the sea. Like other rivers in this section it rises rapidly during spring thaws or heavy rains.

At present two flood-control dams are being built on these rivers, one on the Pemigewasset near Franklin and just above its confluence with the Merrimack and the other 18 miles south on the Merrimack at Blackwater, New Hampshire. Each is a part of the Merrimack Valley Flood Control Project of the War Department.

The Franklin Falls Dam, the larger of the two, is to be a rolled-earth and rock-paved dam with a 1,700-foot crest, a maximum height above the stream bed of 130 feet, and a top width of 35 feet. It will be built at a cost of about $4,500,000. The concrete work will consist of a 550-foot wide spillway, intake structure, twin conduits, concrete-lined stilling basin and an operating house. Excavation was started in October, 1939, and the project is expected to be completed about June, 1942.

The Coleman Brothers Corporation of Boston, Massachusetts, was awarded the general contract for this dam and sub-let the concrete construction to the Great Lakes Dredge & Dock Company of Chicago, Illinois. Coleman Brothers, in addition to doing the excavating and filling, are producing all the sand and gravel required. This totals about 300,000 cubic yards, of which about 78,000 cubic yards is concrete aggregate and the remainder is filter stone.

The Kennedy-Van Saun Manufacturing & Engineering Company was engaged to design, equip and supervise the erection of the sand-and-gravel plant at a deposit near the east end of the

By W. E. TRAUFFER

Well-Designed Plant Supplies Aggregates for New Hampshire Flood-Control Dam Project

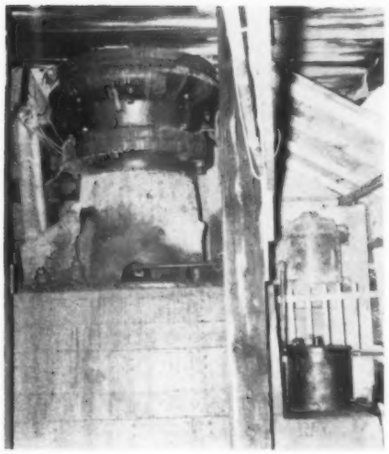
dam. A construction superintendent was provided and he remained in charge of operations until the plant met its guarantees. This was accomplished soon after the plant went into operation early in April of this year. Production averages about 165 cubic yards per hour of which about 65 cubic yards is sand.

These requirements are being met from a deposit which averages 65 per cent. sand and 35 per cent. gravel, requiring the wasting of more than half of the sand.

The deposit was stripped of overburden before excavation was begun. A Link-Belt Number 45 gasoline shovel with a 1½-cubic yard Amsco dipper loads the material into two Oshkosh 12-cubic yard bottom-dump Diesel tractor-trailers. These are equipped with 16-ply, 18- by 24-inch Firestone heavy-duty tires. When not supplying the plant, these outfits are used to haul finished aggregates from the plant to the job.

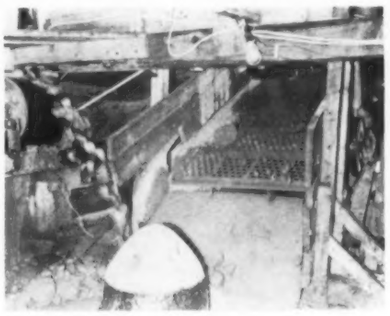
The material is dumped through a 14-inch rail grizzly into a hopper, from which it is fed on a 30-inch by 55-foot belt-conveyor. This conveyor feeds the material to a 5- by 8-foot Kennedy-Van Saun single-deck vibrating screen with 2¼-inch openings. The oversize material goes direct into a 14-inch Kennedy gearless gyratory crusher. The 2¼-inch minus crusher product is discharged with the material through the screen on a 30-inch by 138-foot belt-conveyor, which discharges through a split chute to a pair of 4- by 12-foot 2-deck Kennedy vibrating screens. These screens have perforated plates with 2⅛-inch openings on their top decks and ¼-inch on their bottom decks. Material passing over the top deck is returned to the crusher on a 16-inch by 100-foot belt-conveyor.

Sand passing through the bottom decks of these screens goes through special chutes into an 8-foot Kennedy counter-current cone classifier. These chutes are so arranged that any desired percentage of the sand from either screen can be wasted. If desired, the entire sand output from one screen can be wasted. Sand is discharged from the classifier on a 30-inch by 50-foot horizontal dewatering belt-conveyor, which is concave in the usual manner at its feed end, flattens out toward the middle, and becomes convex at its discharge end. This construction gradually drains the water out of the sand without an excessive loss of fines. The drained sand is discharged on an 18-inch by 210-foot belt-conveyor which takes it to a stock-pile. Sand is loaded into trucks for transportation to the job by a Barber-Greene stock-pile loader.



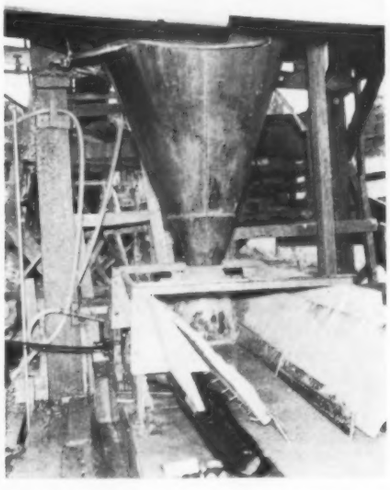
The primary crusher with direct V-belt drive at the right.

The material retained on the bottom decks of the two screens just mentioned is discharged on an 18-inch by 210-foot inclined belt-conveyor. This feeds an 18-inch by 100-foot horizontal stock-piling belt-conveyor. A Link-Belt tripper makes it possible to discharge from this belt into stock-piles or into either



The scalping screen and, in foreground, part of the primary crusher. Conveyor at left is returning oversize from secondary screens.

This view shows the conveyor from hopper, scalping screen, primary crusher and conveyors to and from the sizing screens.



Sand being discharged from settling tank on the dewatering belt-conveyor.

of two 100-ton truck-loading bins when producing filter gravel. When concrete aggregate is being produced it is discharged from the belt-conveyor on a Kennedy 4- by 10-foot 2-deck final-sizing screen. This has 1¼-inch openings on the top deck and ¼-inch on the bottom deck. The 1- to 2-inch gravel off the top deck goes into one bin and the ¼- to 1-inch gravel off the bottom deck into the other.

Wash-water for the plant is supplied through a 12-inch line from the river at the rate of 1,500 g.p.m.

The Kennedy-Van Saun Manufacturing & Engineering Company supplied most of the equipment used in this plant, including the screens, crusher, sand cone, belt-conveyors and steel conveyor trusses. All the conveyor belting was supplied by the New York Rubber Corporation, the double-corrugated screen plate by the Cross Engineering Company, and all the motors and gear-motors by Westinghouse. Gates V-belt drives operate all the equipment except four of the beltconveyors which are driven by gear-motors. A total of 190 connected motor horsepower is used.

"Onlooker" (from page 65)

there are many ready, eager and willing to help solve the increasing problems of all industries and specifically, the lime industry. As mentioned in the foregoing, this requires adequate financial backing to accomplish the desired end. Therein lies our weak point: the lack of long-range planning and financing finds us in this maelstrom of industry, lost, so to speak, and bound for an uncertain destination.

We can yet change our plans, our destination, our whole outlook and it can be in the direction of worth-while accomplishment. This desire to progress with other industries, if such progress is inspired, places before us again a salient feature of our whole problem —the spirit of good faith and understanding of the other fellow's problem, which is likewise ours.

In this day of competition, changing world-wide social and economic conditions, let us pause and reflect just a little. In the spirit of the times consider the oft-repeated axiom, "Live and let live." This may be aptly applied to our own industry, meaning let there be understanding among us, fair and equitable competition, a desire to progress technically, socially and profitably. Now is the time and the opportunity to start accomplishing our aims and ambitions, aided by the present increased demand for lime products by reason of our national-defense needs. A weak industry helps no one; a strong industry is a real asset to our nation.

Business (from page 23)

resents only the spread of primary defense contracts throughout the industrial structure of the nation. The figures do not show the subcontracts by which raw materials and sub-assemblies are provided for the main contractor. In many industries these subcontracts represent more than 50 per cent. of the entire expenditure. For example, a recent study showed that 536 manufacturers located in 30 states contributed to the construction of one bomber, thus spreading much more extensively than shown in this tabulation the actual distribution of defense contracts throughout the entire nation.

There is probably less spreading of activity as the result of construction contracts than in the cases of airplanes, ordnance, and the like but even construction must draw heavily on other areas for supplies. The value of construction contracts increased in October, according to the F. W. Dodge Corporation and the Federal Reserve Bank of San Francisco. Variations in recent months have reflected principally fluctuations in awards for public projects. Awards for private construction have shown about the usual seasonal changes, following a sharp rise in July and August.

Industrial output rose sharply in October and the first half of November. In addition to defense contracts orders for civilian needs continued in large volume. Industrial production, as measured by the Federal Reserve Board's seasonally-adjusted index, rose further in October to 128, the highest level in the history of American industry. The index in September was 125 and the previous peak last December was 126. Steel-ingot production in the first half of November was around 96 per cent. of capacity and it is expected to remain there for months.

Estimating Current for Detonators in Parallel

When a number of detonators are joined to a common pair of supply wires so that the total current delivered to them is divided between them, they are recognized as being connected in parallel. Therefore, if we consider the detonators as resistances labeled as follows R_1, R_2, R_3 and R_4 and forming branch circuits, we then have the same voltage, E, impressed on all the detonators thus:

$$I = \frac{E}{R_1}, I_2 = \frac{E}{R_2}, I_3 = \frac{E}{R_3}, \text{etc.}$$

Therefore, we accept R as the total resistance of the branched circuit, where:

$$I = \frac{E}{R},$$

$$\text{and } \frac{E}{R} = \frac{E}{R_1} + \frac{E}{R_2} + \frac{E}{R_3} + \text{etc.},$$

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \text{etc.}$$

Thus we find that the reciprocal of the total resistance of a branched circuit is equal to the sum of the reciprocals of the separate resistances.

We can calculate the various divisions of current flowing in the individual circuits as follows:

$$I_1 = \frac{E}{R_1}, I = \frac{E}{R},$$

$$\frac{I_1}{I} = \frac{R}{R_1}, I_1 = I \times \frac{R}{R_1}$$

Likewise,

$$I_2 = I \times \frac{R}{R_2}, I_3 = I \times \frac{R}{R_3}, \text{etc.}$$

Suppose we intend to fire four electric detonators in series, each detonator having a resistance of 1.5 ohms and the resistance of the connecting and leg wires is 5.5 ohms. Since a current of 0.5 ohm is necessary to insure that all detonators shall ignite and this current is derived from a number of dry cells, each of which has an E.M.F. of 1.4 volt and resistance of 0.4 ohm, how many such cells will be required?

Let us assume X = the number of cells, and $1.4\ X$ = total E. M. F. impressed on the circuit.

The resistance (R) values are arrived at as follows:

4 detonators at 1.5 ohms each	= 6 ohms
Connecting and leg wires	= 5.5 ohms
X cells of 0.4 ohm each	= $.4\ X$ ohms
Total R	$= 11.5 + .4\ X$

$$\text{Current } I = \frac{E}{R} = \frac{1.4\ X}{11.5 + .4\ X}$$

and

$$I = .5 \text{ amp.},$$

$$\frac{1.4\ X}{11.5 + .4\ X} = 5.,$$

$$1.4\ X = 5.75 + .2\ X.,$$

$$1.2\ X = 5.75,$$

$$X = \frac{5.75}{1.2} = 5 \text{ cells}$$

to the nearest full number.

MARBLE CLIFF'S NEWEST LIME PLANT

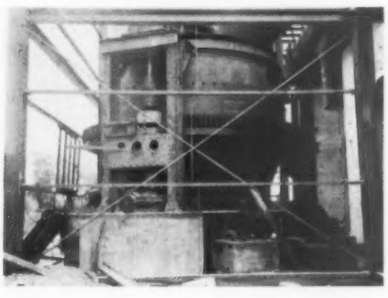
Some of the storage and separating tanks.

THE new lime plant of the Marble Cliff Quarries Company, which is located about ½ mile north of Lewisburg, Ohio, and has been under construction since early in the summer, is to go into operation shortly.

The plant, which will produce pulverized quicklime, pebble and lump lime and two sizes of hydrate, has two vertical kilns served by a 230-foot incline. Stone is to be obtained from an adjacent deposit, which also supplies the crushed-stone plant on the property purchased about a year ago from the National Lime & Stone Company. The deposit, long worked as an open quarry, is now being mined to obtain the high-calcium stone for the new lime plant.

A Wood automatic gas-producer will fire the kilns through center burners, using a recently-developed system of forced draft. The kilns are 66½ feet high and are elliptical in shape with their largest diameter 14 feet, 2 inches. A Thomas 2-speed hoist will pull the cars up the charging incline, slowing down as the cars break over at the top. A dual Raymond system with Whizzer separators will handle the output from the Clyde continuous hydrator, producing both standard and a super-fine hydrate.

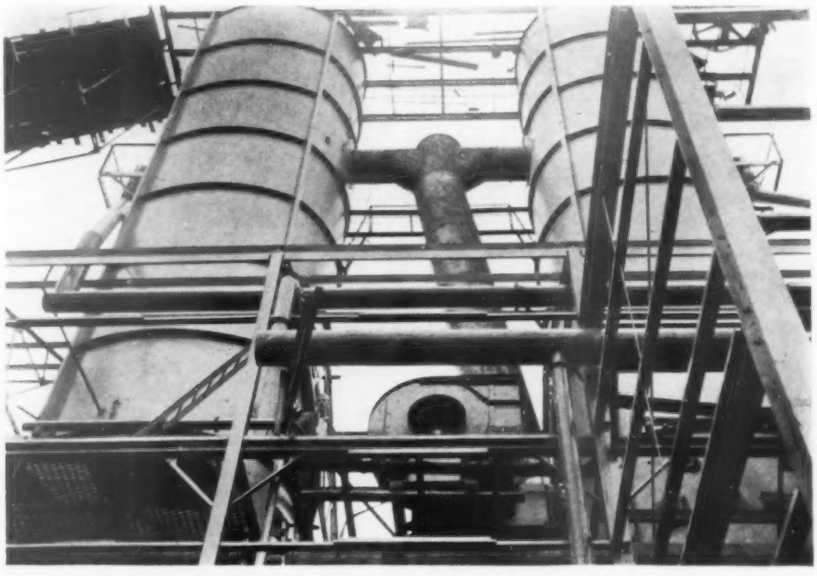
Other equipment includes Ty-Rock and Hummer vibrating screens, Clarage fans and blowers, Jeffrey-Traylor vibrating feeders, Allis-Chalmers motors and an Eagle crusher. A rotary kiln may also be installed later.



Installing the automatic gas-producer.

A view of the lime plant under construction. Stone plant is at right of charging incline.

A quarry view. Adit to new mine at right of shovels.



Looking up between the kilns while construction was in progress.

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It's a miser for maintenance —yearly upkeep is less than 1% of original investment
Believe it or not — it takes only ½ HP to operate under full load
THE Leahy HEAVY DUTY VIBRATING SCREEN
Note the Free-Swinging Screen Jacket — the only part that vibrates
— does it have high efficiency!—Its rating averages 90% and runs as high as 97%

The outstanding success of **TRI-VIBE** in 1940 makes the LEAHY No-Blind Vibrating Screen your best buy for 1941 for all jobs of *fine mesh screening.*

This exclusive engineering feature gives triple-powered vibration to the free-swinging screen jacket and distributes the differential vibrating action to all areas of the screen cloth . . . as effective at the edges as in the center.

The resulting increase in capacity is so great that you can use a shorter length screen for a given output . . . and thus save on *first* cost, as well as on overall operating cost. Write for Bulletin, and get the facts before you order your next screen.

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PERSONAL MENTION

RICHARD PAUL has purchased the business of the Deep Rock Sand & Gravel Company and the Transit Ready Mixed Concrete Company at Fort Dodge, Iowa, and will continue operation of both plants under the name of the Paul Concrete & Material Company.

J. H. MAXWELL, who has been operating a sand-and-gravel plant southeast of Grand Rapids, Minnesota, is putting in machinery for the manufacture of concrete blocks, brick and tile.

CARLTON M. ROGERS has been appointed manager of production and transportation by the Pacific Rock & Gravel Company of Los Angeles.

HARROLD WALLING has purchased the Salem Gravel Supply Company in Salem, Oregon.

A. W. WORTHINGTON has been elected president of the Pittsburgh Limestone Corporation. He was formerly vice-president and general manager. He succeeds MacGilvray Shiras who retired recently. Other officers elected were: H. B. WILSON, secretary and auditor, and F. R. STRANG, treasurer. Mr. Wilson was formerly assistant auditor and Mr. Strang, accountant. H. L. GORDON, formerly assistant general manager, has been appointed vice president of operations, and R. E. LARRY has been named assistant to president.

B. C. BERRY and P. D. OESTERLE are in charge of the office recently opened at 271 Madison Avenue, New York, by the Allen-Sherman-Hoff Company.

W. J. YOUNG, for many years chief engineer of the Standard Lime & Stone Company, Baltimore, has been promoted to consulting engineer for all the company's properties.

C. W. LOWE of Bluffton, Indiana has been made superintendent of the Mid-West Rock Products Corporation plant and quarry at Spencer, Indiana, succeeding V. C. Thomas.

HAROLD PLASS has purchased the interest of LEROY NEUMAN in the Merrill Concrete Works, Merrill, Wisconsin, and is conducting the business.

E. C. Andrews, formerly sales engineer with the Lehigh Lime Company, is now a member of the sales organization of the Marble Cliff Quarries Company, Columbus, Ohio.

R. A. Dittmar, superintendent of the Hudson, New York plant of the Universal Atlas Cement Company, was elected general chairman of the Cement and Quarry Section of the National Safety Council at the 1940 Safety Congress held in Chicago recently.

Floyd L. Warner has purchased the sand-and-gravel business of Saxton & Looney, Forest Grove, Oregon, and the name has been changed to the Gales Creek Sand & Gravel Company.

L. Romano has sold his quarry and crushing plant near Seattle to Elias D. Taylor.

R. B. Thomas, who has been assistant manager of sales promotion and advertising, Sullivan Machinery Company, for several years has resigned to join the Trackson Company, Milwaukee.

Helmuth Krarup, superintendent, and J. V. Mandia, chief chemist, of the Hawkeye cement plant at Des Moines which was recently taken over by the Marquette Cement Manufacturing Company, will continue in that capacity.

Henry H. Timken, Jr., has been named chairman of the board of the Timken Roller Bearing Company, succeeding his father, the late Henry H. Timken. He will continue as vice-president and general manager of the Steel and Tube Division.

G. S. Swanson has been appointed Cleveland district sales manager of Williams clam-shell and drag-line buckets by the Wellman Engineering Company.

Edith D. Bedford, 67, vice-president of the Bedford-Nugent Company, sand-and-gravel producer at Evansville, Indiana passed away suddenly on November 2 at Evansville. She was the widow of Jesse Bedford, former head of the concern, who died last February while in California.

Charles H. Wood, 78, former secretary of the American Association of Portland Cement Manufacturers, forerunner of the present Portland Cement Association, died November 4 at his home in Altamont, New York, where he had resided for the last 15 years.

Willard J. Bell, 72, president of the Newaygo Engineering Company and for many years superintendent of the Newaygo Portland Cement Company, died recently at a hospital in Fremont, Michigan of injuries sustained in an automobile accident. He had lived in Newaygo, Michigan since 1899 when the cement plant was built.

E. O. Freeman, 57, superintendent of the Carl Lotz Sand & Gravel Company, Wausau, Wisconsin, died suddenly in the office of the company. He had been an employee of the Lotz concern for nearly 30 years.

Isaac N. Bair, sales manager of the Thomasville Stone & Lime Company, Thomasville, Pennsylvania, died on October 15. He was familiarly known as "Ike" to his many friends both within and without the lime industry.

Cyrus H. Cole, 64, former sales manager of the New York office of the Atlas Portland Cement Company, died recently at his Patchogue, Long Island, home.

Roy D. Prushing, manager of sales, pulverizer and crusher division Jeffrey Manufacturing Company, died recently.

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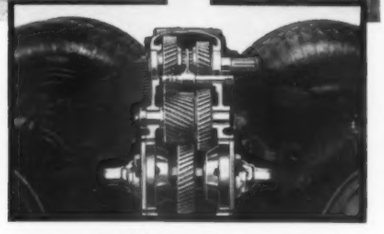

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Manufacturers also of the THORNTON automatic-locking DIFFERENTIAL which gives traction when slippery going makes trucks equipped with ordinary differentials helpless.

"When you need TRACTION you need THORNTON"

STUART L. RAWLINGS, executive vice-president of the Calaveras Cement Company, died November 9.

FRED HENRY HARDY, 74, founder and owner of the Newala Lime Works, died October 30 in a Birmingham hospital. He was a pioneer in his field, being one of the state's oldest lime operators. Survivors include the widow, two daughters and five sons.

LABOR DECISIONS

Bargaining Unit

Pittsburgh Plate Glass Company v. National Labor Relations Board, decided by the U. S. Circuit Court of Appeals, Eighth Circuit, July 23, 1940; rehearing denied, August 12, 1940; reported at 113 Fed. (2d) 698.

In this proceeding the Pittsburgh Plate Glass Company petitioned for a review of an order of the National Labor Relations Board, the effect of which was to require the company to recognize its production and maintenance employees (with certain exceptions) at its six flat-glass plants as the appropriate unit for collective bargaining, and to bargain collectively with the Federation of Flat Glass Workers of America as the representative of all such employees. It was contended that the selection of employees at all six plants as an appropriate bargaining unit was arbitrary and in disregard of the wishes of 1,500 of the 1,800 employees at the plant at Crystal City, Missouri.

The court notes that the Crystal City plant is some 600 miles away from any other of the company's plants; that the manufacturing methods are somewhat different; that the plant has its own superintendent, who employs and discharges those who work at the plant; and that the arious plants do not exchange employees. The board, under the circumstances, "properly might have determined that the employees at the Crystal City plant were a homogeneous group whose wishes as to representation for the purposes of collective bargaining should be respected and who constituted an appropriate unit for collective bargaining; but" (says the court) "we think that it was not compelled to do so."

The determination of the question was, according to the court, a matter for the board, and the court cannot substitute its judgment for that of the board. The decision of the board "was not arbitrary or invalid" and the order will be enforced.

Foremen

National Labor Relations Board v. Skinner & Kennedy Stationery Company, decided by the U. S. Circuit Court of Appeals, Eighth Circuit, July 25, 1940; rehearing denied, August 16, 1940; reported at 113 Fed. (2d) 667.

An order of the National Labor Relations Board required the respondent company to withdraw recognition from and to disestablish an Association of its employees, and to reinstate with back pay two employees discriminatorily discharged because of union activities. The board's findings of facts are held to be supported by evidence sufficient to sustain them ("the law does not require that the evidence to support the board's findings must all be consistent nor undisputed"), and the board's petition for enforcement is granted.

It was argued that one of the discharged employees, being a foreman, was an "employer" and not an "employee," because an "employer" is defined to include "any person acting in the interest of an employer" (National Labor Relations Act, Section 2(2)). But Sec. 2(3) provides that the term "'employee' shall include any employee." "There is no inconsistency in these provisions when facts are taken into consideration. A foreman, in his relation to his employer, is an employee, while in his relation to the laborers under him he is the representative of the employer and within the definition of Section 2(2) of the Act. Nothing in the Act excepts foremen from its benefits nor from protection against discrimination nor unfair labor practices of the master."

Supervisory Employees

National Labor Relations Board v. Christian Board of Publication, decided by the U. S. Circuit Court of Appeals, Eighth Circuit, July 25, 1940; reported at 113 Fed. (2d) 678.

This decision sustains and decrees enforcement of an order of the National Labor Relations Board ordering withdrawal of recognition from and disestablishment of an Employees' Committee found to be dominated and supported by the employer.

Among various objections to the order, it was claimed that the board should have attached no significance to the conduct of supervisory employees in the promotion of the Employees' Committee. The court holds, however, that the employer "must be held responsible for the acts of its supervisory employees

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Kiln Ends have a way of burning out most unexpectedly. Such accidents are not only frequent and widespread but costly.
Operators suffer heavy losses from shutdowns, repairs and crippled production . . . *except* in mills that have installed PYRASTEEL Kiln Ends.
These last for years, instead of months or weeks. They pay dividends in extra economies by saving fuel, reducing maintenance, and insuring uninterrupted kiln output.

Segments easy to assemble or replace.

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PYRASTEEL for high temperatures
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even though those employees may be included in an appropriate unit for collective bargaining. If it were otherwise an employer could freely influence his employees' freedom of choice by this means yet claim immunity. As between respondent and its foremen the doctrine of *respondeat superior* applies and the responsibilities of that relationship are not suspended merely because the foremen chance to be included within the appropriate unit for collective bargaining."

The contention that the board has no power to order the disestablishment of the Employees' Committee and the voidance of its contract because the Committee was not a party in the hearing is decided adversely on the ground of *National Licorice Company v. National Labor Relations Board,* 309 U. S. 350, 60 S. Ct. 569, decided March 4, 1940, and *Bussmann Mfg. Co. v. National Labor Relations Board,* 111 Fed. (2d) 783, decided May 14, 1940.

Union Activities

National Labor Relations Board v. Viking Pump Company, decided by the U. S. Circuit Court of Appeals, Eighth Circuit, July 29, 1940; reported at 113 Fed. (2d) 759.

The evidence in this case showed that after an outside union began its efforts to organize the respondent company's employees, the plant foremen and other supervisory officers called and addressed meetings of the employees, during working hours, informing the men that the employer would close the plant rather than have an outside union. A committee of employees negotiated a wage increase, and a foreman advised some employees to forget about the union. The court holds that the evidence sustains the board's findings of interference, restraint and coercion, and decrees enforcement of the board's cease and desist order.

The evidence is also held to sustain a finding that the discharge of certain employees who had engaged in union activities was discriminatory, and the board's order for their reinstatement with back pay will likewise be enforced.

Contract

In re State Labor Relations Board (The Nevins, Inc.), decided by the New York Supreme Court, Special Term, Kings County, August 3, 1940; reported at 22 N. Y. S. (2d) 40.

The employer (a restaurant) involved in this case had a collective-bargaining agreement with a union representing its employees, providing that the parties would be governed thereby until December 31, 1937, and that during such period there should be no strike or lock-out. After some disputes, most of the employees on July 31, 1937, went out on strike. Twice the parties attempted to compose their differences; thereafter, the restaurant applied to the Supreme Court for a decree to compel performance of the contract.

The State Labor Relations Board ruled that the employer was guilty of unfair labor practices, having violated Section 704, Subdivision 6, of Article 20 of the Labor Law, by refusing to bargain collectively with the representatives of the employees, and ordered the employer to reinstate the striking employees. The court holds, however, that when, after efforts to procure a peaceful settlement which had proved abortive, the company sued for enforcement of the contract, it was within its rights. "Having invoked the aid of the court for a determination and enforcement of its rights under the contract, can it be said that the employer engaged in an unfair labor practice because it did not thereafter desist, upon the demand of the union representatives, and thereupon accede to their desire that the matter be adjusted through mediation, arbitration or some similar medium?"

Since it is thus held that the employer did not violate the statutory prohibition, it is likewise held that the employer is not bound to discharge employees hired to replace the strikers, nor to reinstate the striking employees.

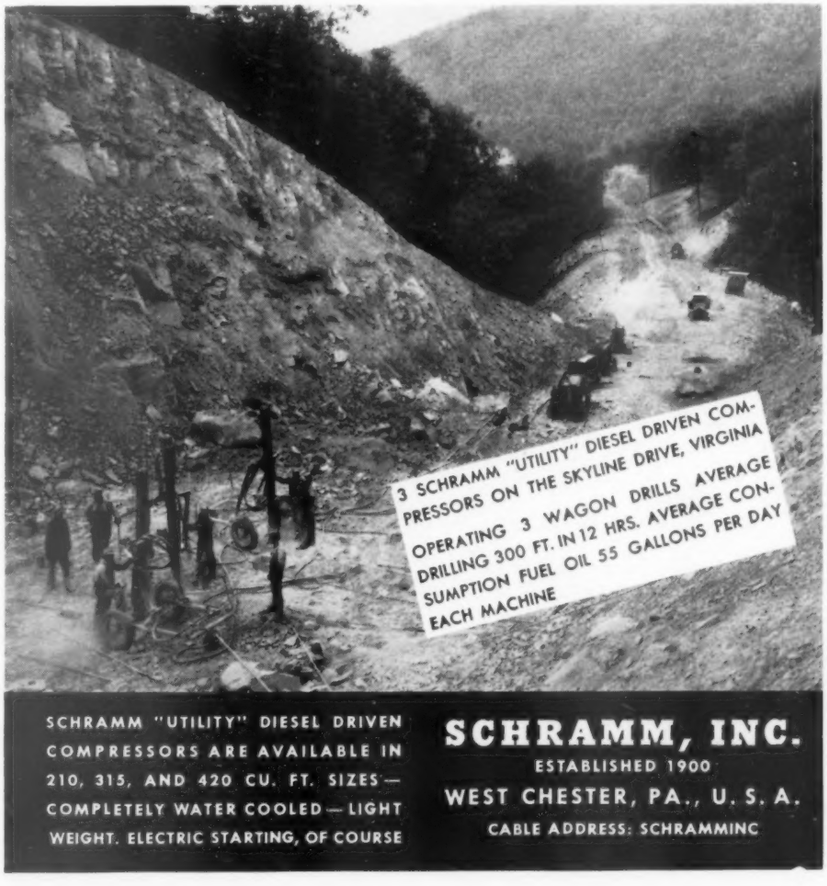
TRAFFIC NEWS DIGEST

Interstate Commerce Commission

Sand and Gravel.—The Supreme Court of the United States, October 14, in No. 139, Chicago and North Western *et al. v.* Rockwell Lime Company *et al.*, refused to review a decision of the Supreme Court of Illinois concerning rates on sand and gravel into Chicago.

The petition for review said the fundamental question was whether administrative determination of the federal commission and state commissions in joint hearings could be defeated and set aside collaterally by state courts. The Illinois Supreme Court, according to the application for review affirmed, the judgment of the Circuit Court of Cook County setting aside an order of the Illinois commission dismissing a complaint on behalf of the respondents herein, seeking damages for alleged illegal rates on sand and gravel between September 10, 1925, and February 15, 1927, applicable on shipments from origins on the North Western and Milwaukee railroads to Chicago in what is known as Zone 1. The railroads asserted that the courts directed the Illinois commission to require the railroads to make restitution in disregard of the fact that the contentions of the respondent were found to be without foundation by the Illinois commission and by the federal body.

The respondents in their answer to the application for review said that none of the errors attributed to the Illinois Supreme Court were committed by it.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Cement-Mixing Compound. — No. 28330, Tuco Products Corporation *v.* Bush Terminal *et al.* heard by the commission was dismissed. Fifth-class rates on mixed car-load shipments of dry cement flooring compound and floor oil, from Chicago to Coney Island, New York, made between January 15, 1937, and August 17, 1939, inclusive, declared not unreasonable.

Reparation and waiver of collection were sought, but reparation was denied. The report said the defendants should immediately proceed to collect all the outstanding undercharges which were not barred by the statute. Nothing herein, it said, should be construed as a condonation of the failure of defendants to take all the necessary steps within the statutory period to collect or the failure of the complainant to pay applicable charges.

Industrial Sand.—A proposal that the commission find unjustly discriminatory against interstate commerce state-compelled rates on industrial sand from Polk and Utica, Pennsylvania, has been made by Examiner Burton Fuller in a report on No. 28150, industrial sand within western Pennsylvania. The rates proposed for condemnation apply from distances of 200 miles and less in western Pennsylvania on industrial sand, other than naturally-bonded, moving in open-top cars, over through routes in joint-line hauls.

The examiner said the commission should find that sand of that description was not contributing its fair and just proportion of the revenue of the railroads, which made complaint about them, and that by reason of that fact the complaining railroads were suffering substantial losses in revenue to which they were justly entitled. Further, he said the commission should find that an increase such as recommended by him would not increase the intrastate rates above a reasonable level, and that the respondent railroads were in need of increased revenue and that the bases of rates recommended by him would substantially increase their revenues from that traffic.

Examiner Fuller said that intrastate rates based on the so-called West Penn joint-line scale, with reasonable grouping, eastbound from Ohio into Western Pennsylvania and between Pennsylvania and other adjoining states prescribed on like traffic in Industrial Sand Cases, 1930, 188 I.C.C. 99, 204 I.C.C. 159, increased 10 per cent. under the general increase of 1938, were just and reasonable rates. He said transportation conditions relating to the traffic under consideration were no more favorable over intrastate routes from Polk and Utica to destinations in western Pennsylvania than over interstate routes between the same points or interstate from Ohio into western Pennsylvania and points in adjoining states. In calculating the rates to be established average distances from Polk and Utica are to be used.

In accordance with the commission's practice in such cases, Examiner Fuller said that it should leave the matter of adjusting the intrastate rates to conform to the proposed findings to the respondent railroads and the Pennsylvania commission. If that was not accomplished within 60 days from the service of a final report consideration should be given by the commission to entry of an appropriate order.

This investigation was instituted by the commission on a petition of the Pennsylvania and the Baltimore & Ohio and some of their affiliated short-line connections with a view to determining whether the present rates, made or imposed by the Pennsylvania, caused or would cause any preference or prejudice as between persons or localities in intrastate commerce on the one hand and localities and persons in interstate commerce on the other, or unjust discrimination against interstate or foreign commerce; and to determine what maximum or minimum charges, if any, should be prescribed for the removal of any such unlawfulness. All common-carrier railroads in Pennsylvania were made respondents. One sand producer, with pits at points in Ohio and Pennsylvania, a number of manufacturers of steel castings at points in Pennsylvania, and the Erie railroad, the examiner said, adduced evidence against any increase in rates from Polk and Utica. According to the examiner, interstate rates on industrial sand in official territory, with a few exceptions, are on the bases prescribed in the case mentioned.

After setting forth that the annual revenue for the Pennsylvania and the Baltimore & Ohio from Utica under the intrastate rates was from $8,800 to about $10,000 a year less than it would be under the interstate scale the examiner said a continuation of the present level of rates from Polk and Utica would inevitably cause a breakdown in the rate structure, state and interstate, with consequent losses in revenue far exceeding the direct effect on the Polk-Utica traffic. The Erie is the originating line at Utica. Those opposing the destruction of the Pennsylvania intrastate adjustment contended that the West Penn scale was unreasonably high, the car-mile yield from it on a 60-ton car-load of sand being greater than the basic scale yield on box-car traffic based on a 45-ton loading.

As the Ohio sands were used for different purposes and were generally shipped by the same producer as the Polk-Utica sand, there was no basis for a Section 13 finding as between persons and localities interstate from Ohio and intrastate in Pennsylvania. The finding recommended by him is confined to unjust discrimination against like traffic in interstate commerce.

Motor Proposed Reports.—MC 95224, Sub. No. 2, Rene Comeau, Vermont-New York extension. Examiner A. S. Parker. Served October 30. Certificate proposed. Lime and limestone products over an irregular route from points in Berkshire county, Massachusetts, to points in Bennington and Windham counties, Vermont, except Brattleboro, and points in New York on and east of New York Highway 26, except those on and south of a line from Schroon Lake through Ticonderoga to the Vermont state line, on and east of a line from Schroon Lake through Schenectady and Kingston to Harriman, and on and north of a line from Harriman through Peekskill, New York, to the Connecticut state line.

MC 84420, Ignacio R. Venero and Henry Wear, dba Rivas Transfer, common-carrier application. Examiner L. B. Dunn. Served October 15. Certificate recommended. Continuance of operation, granite from Barre, Vermont, to points in New York, over irregular routes.

MC 96217, William E. Luxmore, common-carrier application. Joint board 54. Served October 15. Certificate recommended. Limestone and crushed rock, from Linwood, Iowa, to points in Henry and Mercer counties, Illinois, over irregular routes.

MC 55462, Sub. No. 1, Harry Herbert Hancock, common-carrier application. Joint board 7. Served November 1. Certificate recommended. Agricultural lime, building lime, and masonry mortar, from points in Boutetort county, Virginia, to points in North Carolina, over irregular routes. Modified procedure. Hearing on request.

The American Air Filter Company announces that press notices of its purchase by a large electrical manufacturing company were premature. Negotiations, which never advanced beyond the preliminary stage, have been definitely abandoned by mutual consent of both companies.

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NEW MACHINERY AND SUPPLIES

• Bag Closures

The closing and subsequent opening of cloth bags has presented an interesting problem in the cement industry. In addition to the problem of finding a method of closure that could be economically applied and that would allow opening without serious damage to the bag, two new problems have been presented. The first arose from the greater volume of high-early-strength cement and other finer ground cements which made it desirable to find a means of closing that would give bags now on hand a greater capacity; the second problem was to find a satisfactory method of marking the bag for identification of its contents over and above that which is printed on the bag itself. Recently in some sections of the country the industry was faced with the requirement that all cement packages be marked with certain identifying labels, but of more general interest is the fact that the A.S.T.M. has recently approved tentative specifications for five types of Portland cement with the requirement that each package be clearly identified as to the type of its contents.

R. B. Fortuin has invented a method of bag closure which economically closes the bag in such a manner as to give it the greatest volumetric capacity, which affords a means of completely identifying the contents of the package, and which allows the bag to be opened with the least possible expenditure of time and effort and without the use of tools and without damage to the bag. This method can be applied to the bag either before or after filling it. Two cement manufacturers facing these problems—namely, Pennsylvania-Dixie and Nazareth—working originally alone and now jointly through the Bag Closure Corporation of Nazareth, Pennsylvania, collaborated with the inventor in its development.

The method is referred to as the Rip-Cord Closure. The materials used are:

1. A specially designed 26-ply cotton cord of 70 pounds minimum tensile strength.

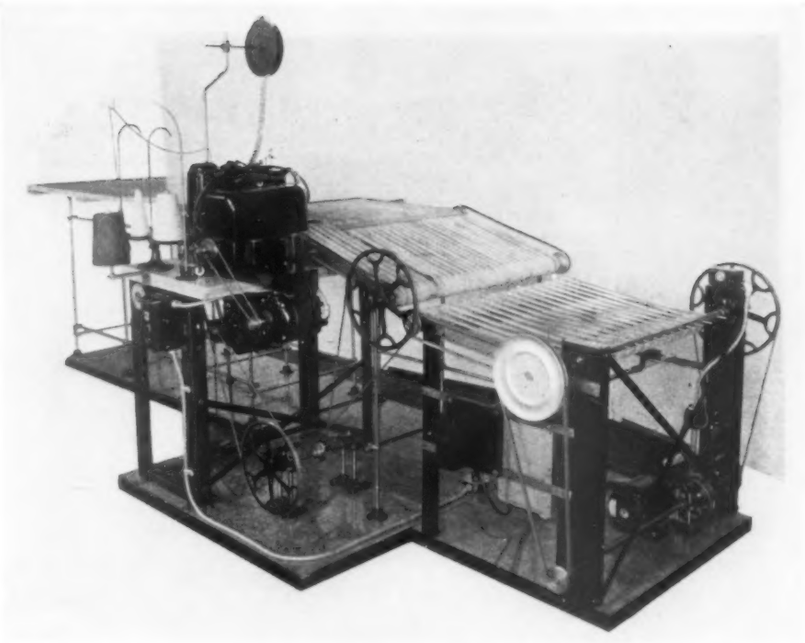
2. Printed 1-inch in width 30-pound (basic weight) kraft paper.

3. Number 12 3-ply thread and number 16 3-ply thread.

The cord can be furnished on 4½-pound cones and the paper on rolls of 1,000-foot rolls. Cord, paper and thread can be obtained in any desired color.

The Rip-Cord Closure is applied by sewing the cord and paper strip across the face of the bag adjacent and parallel to the hemmed edge of the mouth. About a 2-inch loose extension of cord and paper is left at each side of the bag. The resiliently-compressible cord provides a cushion for absorbing the shock and strain on the thread in the process of filling the bag on the packing machine. Another object of the cord is to provide a removable closure which eliminates the danger of damage to the bag. The removal is accomplished by grasping either protection of loose cord and ripping the thread stitches toward the opposite side of the bag. The ripping operation fractures the needle threads progressively across the bag. By placing any desired printing on the paper strip it may be used to provide a means of describing the contents of the package. The use of the printed paper would be particularly desirable for printing code numbers and specifications for various Portland cements required by various municipalities and laboratories.

In order to apply the Rip-Cord Closure



Machine which sews the rip-cord closure on bags. Automatic stacker at right.

The rip-cord closure can be removed quickly and easily.

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24 INCHES
The Strongest Part is the Spiral Seam
– and there is PLENTY OF SPIRAL
THAT spiral lap welded seam reinforces each length of Taylor Spiral Pipe from end to end—gives it strength beyond that of any pipe of its weight. In Taylor Pipe the pitch of the spiral is carefully selected for each group of sizes to give the proper structural strength for the given pipe diameter, as shown above.
This stronger but lighter pipe can cut your costs. There is a type of joint—a type of protective coating—a size and gauge —for every service where a light walled pipe is used.
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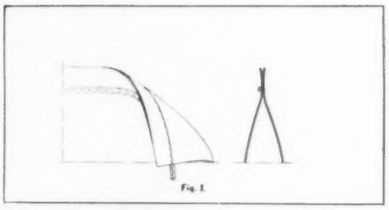
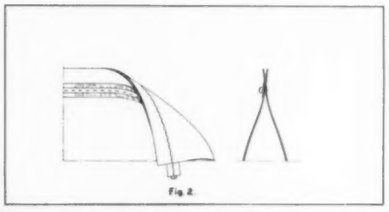
method, a special high-speed sewing-machine production unit has been developed. This unit comprises:

1. A Union Special sewing machine with a puller whose normal speed of 4,000 stitches per minute is reduced to approximately 3,200. The stitch length is set at not more than 4 to the inch. This machine is fitted with a special foot for feeding cord and paper strip simultaneously. Three-ply number 12 thread is used in the looper and 3-ply number 16 thread is in the needle. Satisfactory performance can also be obtained by using 3-ply number 16 thread in both.

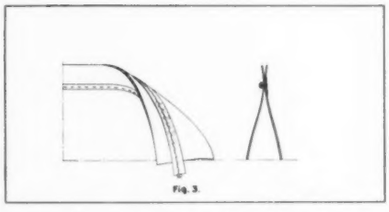
2. A conveyor table constructed of a series of parallel 1-inch canvas belts running on 3-inch pulleys. The speed of this conveyor is synchronized with the speed of the sewing machine. As the bags are drawn through the puller attachment of the sewing machine an automatic scissor-type knife cuts the cord and paper strip in the span between the bags. The length of loose cord and paper left projecting from the edge of the bag by the knife can be accurately gaged by the operator. A finger switch located directly in the course of the travel of the bag as it is drawn through the puller actuates the knife cutter.



Method of closure using cord only.



Closure using both cord and paper strip both sewed on face of bag.



Cord-and-strip closure with cord on face of bag, strip on opposite side.

3. A discharge conveyor operating at about double the speed of the table conveyor. This conveyor discharges the bags on the fingers of the automatic stacker. It is constructed similarly to the table conveyor.

4. An automatic stacker constructed of a number of fingers attached to an arm running the width of, and parallel to, the end pulley of the discharge conveyor. These fingers in the "rest position" lie horizontally between the belts of the discharge conveyor. A switch, located between the belts of the discharge conveyor and tripped by the bag, actuates the operation of the stacker. In lifting the bag the fingers travel in a 180-degree arc, accurately piling the finished bags. The stacker can be set to stack 50 or 100 bags at the option of the operator.

5. A hard-wood top stock and feeder table, which consists of a top 3 feet wide and 6 feet long with cutouts for fitting snugly against the conveyor table and sewing machine and to allow seating space for the operator. This table size allows the operator to have an ample supply of bags available for processing.

A bell signal and a counter are mounted on the sprocket wheel of the cutter. The bell signal sounds as each fiftieth bag passes through the cutting knife.

The over-all length of the entire unit is approximately 14 feet, the width 6 feet. An operator with average skill can easily apply the Rip-Cord Closure at an average rate of 900 or more bags per hour.

One thousand cement bags with 2-inch projections on each side of the bag require approximately 2½ pounds of cord so that a cone of 4½ pounds allows approximately a 2-hour run before replenishment of cord is necessary and in an 8-hour day results in only 3 operator time losses for installing new cones of cord. Using knotless thread and proper setting of tension on sewing head eliminates time losses due to breakage of the thread. New rolls of paper are added on the "fly".

The following figures must be considered as approximate costs:

Cost per Thousand Bags

2½ pounds of cord @ 25c	$0.62
2¼ pounds of 1 inch paper strip @ 20c	.45
.9 pound of thread @ 30c	.27
1 operator, 57c per hour, 900 bags per hour	.64
	$1.98

If the application is made without the use

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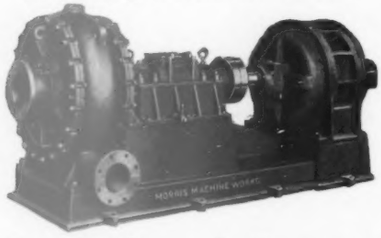
that increase sand and gravel production and reduce operating and maintenance costs. Every type, size, and method of drive.



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PERFORATED METAL SCREENS

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Manufactured exactly to your specifications.

Any size or style screen, in thickness of steel wanted with any size perforation desired.

We can promptly duplicate your present screens at lowest prices.

Prompt Shipment

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of the paper strip the cost will subsequently be reduced 45 cents, resulting in a net cost of $1.53.

The company summarizes the feature of the closure by pointing out that it is easily and economically applied and easily removed; there is no damage to the fabric of the bag; the cord and paper combination offers a medium for identifying the contents; various colors of cord may be used as an added identification for trade purposes; the maximum volume of the bag becomes available for use; the available volume of the bag may be controlled by predetermining the distance from the mouth of the bag to which the cord is applied; it is possible to use 30-inch cut 36-inch bags for regular cement and 30-inch cut 37-inch for high-early-strength cement above 2,600 square-centimeters-per-gram surface area; it makes a one-size bag inventory possible; the hemming cost in the purchase of new bags can be saved; undersized bags can again be placed in active service; it can not be removed and replaced except by the use of special equipment, contamination of the contents being therefore impossible; the ultimate customer may audit the number of bags opened by his workmen by requiring that all removed cords be delivered to him; its use results in a square package, making handling easier; there is no occupational-injury hazard to the worker in removing the closure; no special tools are required to remove the closure; inasmuch as the closure is easily removed, damage to the bag by the use of a shovel point is eliminated; it is adaptable to bags which are closed after filling with contents; after the valve in the bag shows wear the bag may be opened and the valve remade at the other end, and Rip-Cord Closure may be applied at the former valve end, thereby increasing the life of the bag.

• Electric Motors

As a result of a broad survey of the changing requirements of its industrial customers, General Electric announces an entire line of completely new polyphase induction motors, in integral horsepower sizes, to conform with new industrial trends, processes, and practices. Known as the Tri-Clad motor and representing one of the most extensive product changes in the history of the company, it has called for many new methods in G-E motor manufacturing.

In all its ratings it features modern streamlined appearance; more complete protection—through the use of a cast-iron frame—than heretofore available except in especially enclosed machines; major advances in the insulation of current-carrying parts; and improved sleeve-bearing design and lubricating arrangements. At the same time, it incorporates the cast-aluminum rotor, pressure-relief system of greasing for ball-bearing motors, and other proven features. In addition, it offers many new convenient features.

One of the new polyphase induction motors.

In recent years there has been an increasing and widespread demand for more protective features in open, general-purpose motors. Thus, despite its striking modern appearance, major industrial interest in the new G-E motor will undoubtedly center around its outstanding mechanical and electrical protective features. In place of the conventional open frame, it makes use of a cast-iron frame of the box type. The end shields are designed to match the frame and are enclosed above the centerline. This combination of frame and end shields minimizes contact of vital motor parts with foreign material such as lubricants, coolants, and other liquids, as well as chips, tacks, etc., while also protecting it against accidental blows in handling or similar rough usage. The new-type insulation, dust-tight bearings, and the use of Glyptal in the priming and finishing paints armor it against the attack of harmful agents.

• Hard Surfacing

Attempts to combine resistance to wear and strength in one piece of steel generally result in unsatisfactory compromises. Where special alloy steels are employed the wearing parts are expensive, and yet do not fulfill all of the conditions. The solution to the problem is to use a cheap, tough, steel base and cover the wearing surface with a thin layer of hard-facing metal.

It is also found that hard-facing metals have much better wear characteristics than even the hardest of steels. Consequently the combination of the two materials—steel or iron and hard facing—gives a superior product as well as an inexpensive one. Furthermore, the part after being worn, can easily be restored to its original state by recoating.

Strength at high temperatures and resistance to corrosion are also inexpensively obtained by surfacing with a layer of the right type of hard-facing material.

Coast Metals, Inc., Canton, Ohio, has developed a wide range of hard-surfacing metals for special applications in the pit and quarry industries. Most of them are austenitic and have high-temperature properties. For example, Coast Metal No. 112 resists wear, abrasion and impact and is recommended for use on crushers and crusher plates, hammermills, conveyor screws, shovel and dipper teeth, etc. No. 1 and No. 4 are recommended for facing elevator buckets, pins, links, bushings, etc. Literature describing the 12 types available with recommended applications and price list may be had by writing the company.

• Sampler

Fuller-Anderson samplers, a new development by the Fuller Company, Catasauqua, Pennsylvania, are designed to take representative samples from moving streams of cement and other dry pulverized materials, continuously, at a uniform rate.

The sampler illustrated by the drawing on the right is of the type used in connection with a conveying system under pressure, such as the Fuller-Kinyon system, by which dry pulverized materials are transported by air through pipe lines.

As will be noted, a section known as the sampler body is installed in the pipe-line, this sampler body being designed to increase turbulence, so as to insure a representative sample. A small feed screw is placed horizontally across the sampler body, enclosed in a tubular casing with a short, narrow slot in the casing.

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Because you can deliver the goods—to meet specifications—and you operate at a profit. Operating and maintenance costs are extremely low—gross profits per ton are really high. The Universal Plant above, in southern Illinois, is making a nice profit. Produces Agricultural lime, chips and aggregates with a Universal No. 1 Pulverizer, a 1020 Jaw Crusher, Rotary Screen and Elevators. Production averages 100 tons daily.

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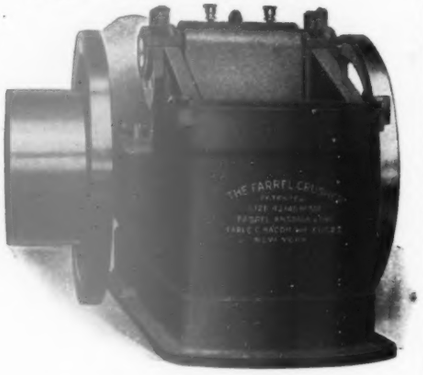
CRUSHERS

Complete plants designed and equipped, including Screens, Elevators and Conveyors. Machinery for Mines and Rock Quarries, Sand and Gravel Plants. Engineering Service



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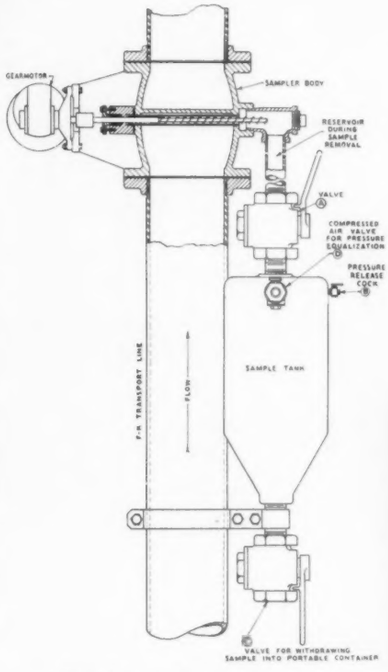
DURAND, MICHIGAN

The material enters through this slot and is carried away by the screw to a reservoir. The screw is driven at slow speed by a ¼ horsepower motor. Protection is provided by a thermal-overload relay which will stop the motor in the event any foreign material be-



Sampler used on pipe-line.

comes jammed in the screw, or the sample tank is neglected and not emptied at proper intervals.

The sample tank is under pressure at all times when the apparatus is started and during operation, compressed air being admitted through the connection D to equalize the pressure in the pipe line and tank. If this is not provided for, a substantial amount of material will be blown into the tank while the pressure is rising to that of the system, and the sample, therefore, will not be representative.

Another model has been developed for use with screw conveyors.

• Tractor Rims

Renewable rims for worn drive sprockets on Caterpillar tractors are announced by the Alloy Steel & Metals Company of Los Angeles.

The use of these wear-resisting manganese-steel rims effects genuine economy over the old practice of scrapping worn-out sprockets. Besides the obvious savings effected by replacing only the rim instead of the whole sprocket, there is another important advantage. Rebuilt in this manner the sprocket actually lasts longer because of the wear-resistant manganese steel used in the rims.

The renewable sprocket rims are easily installed by welding according to standard practice.

One of the renewable rims.

• Locomotives

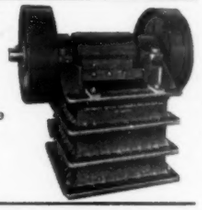
A new series of Brookville locomotives, in 4, 5 and 6 tons weight, is now available with the UD-6 International Diesel engine recently introduced by the International Harvester Company. This engine is a 4-cylinder, 4-stroke cycle, full Diesel developing 39 horsepower at 1,500 r.p.m.

As used in the Brookville locomotive, the UD-6 Diesel engine makes an ideal power

One of the Diesel locomotives.

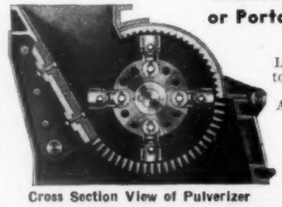
LOW COST CRUSHING FOR 55 YEARS
For Large Capacity you can depend on
GRUENDLER EQUIPMENT
FREE—Write for our 16-page Catalog and Specifications

Bronze or Roller Bearing
JAW CRUSHERS
Heavy Armor plate steel or cast steel Constructed
Large capacity
Small power Requirements



STRAIGHT LINE ROCK AND GRAVEL CRUSHING AND SCREENING PLANTS

LIMESTONE PULVERIZERS
Adjustable Stationary or Portable



Crushes Large Stone to 2" minus Down to Agricultural Dust

Built In (8 Sizes)

Cross Section View of Pulverizer

GRUENDLER
CRUSHERS · PULVERIZERS · GRINDERS
GRUENDLER CRUSHER & PULVERIZER CO.
2915-21 N. Market St., St. Louis, Mo.

plant. Its high torque at slow speeds gives it the lugging ability of a steam engine. Power is applied efficiently to all four locomotive drive wheels through four forward and four reverse speeds, the latter of which are made available by the Brookville reverse gear operating in conjunction with a heavy duty, four-speed transmission. The work capacity of the locomotive is further increased by the use of steel tires, which increase traction by a full 25 per cent. over chilled-face drive wheels.

Other features of the Brookville locomotive include: dual spring journal suspension, which permits high speed over poor track; an indestructible steel frame; Timken bearings; and use of standard "International" parts in the engine clutch and transmission, to allow field service by any International Harvester branch.

Literature may be obtained from the Brookville Locomotive Company, Brookville, Pennsylvania.

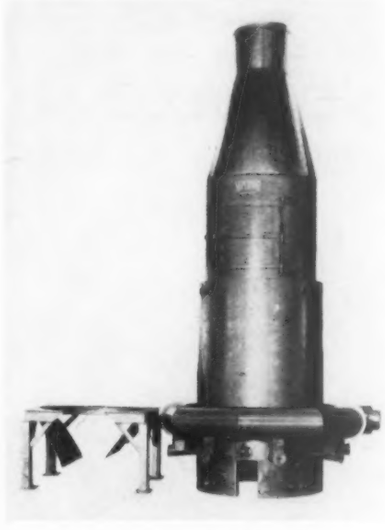
• Cupola

A water-jacketed cupola for use in melting rock or slag, using coke as fuel, in the manufacture of mineral wool is being marketed by Superior Metal Products, Inc., of Marion, Indiana.

Dimensions of the Superior cupola are: stand, 3 feet high; cupola proper, 8 feet high; charging dome, 7 feet high. Inside diameters range from 52 to 54 inches. Most users add 20 feet of 30-inch smoke stack on the top.

The cupola is shipped with bustle pipes and tuyeres knocked down, allowing the complete unit to be shipped in a railroad car or a trailer-truck.

The cupola is made of ⅜-inch firebox steel inside and $\frac{5}{16}$-inch hot-rolled steel outside.



Rock-wool cupola and stand.

The stand is of heavy I-beam and steel-plate construction. Tuyeres and bustle pipes are of 14-gage material.

• Lift Truck

A lifting, carrying, tiering fork truck that will handle loads as heavy as 7,000 pounds, and tier them in piles 15 feet high and higher, is introduced by Clark Tructractor Division of Clark Equipment Company, Battle Creek, Michigan, under the name "Utilitruc."

Found especially valuab'e in loading, unloading and storing bagged cement, lime, gypsum and similar products, the truck is said to achieve important handling economies. Gas-powered, it is capable of 24-hour continuous service. It is made in several models including straight lift, tilting and telescopic tiering. Minimum height is 61½ inches enabling the truck to negotiate low doorways. Minimum capacity is one ton. Heavy steel fingers, with chisel points, vary in length and are adjustable sidewise on the front plate. The operator inserts these fingers under any cleated or uncleated load, lifts the load clear of the floor, tilts it back, elevates it at the rate of 7 inches per second, tilts it forward for easy tiering.

The machine is powered with a 6-cylinder engine, travels at speeds from 1 to 7 m.p.h., climbs ramps under load, has rear wheel steer, and hydraulic brakes.

The Photoswitch electronic level control, Type P30, makes available to industry a simple electronic relay for the level control of both conductive and non-conductive fluids and powders. Installation merely entails attaching a probe fitting to the surface of the tank. Since the equipment includes no mechanical parts, and has an unlimited life, it is replacing more complicated float switches. It is made by Photoswitch, Inc., Cambridge, Massachusetts.

Mobile fork-truck handling bagged material.

The Sterling Pump Corporation, Hamilton, Ohio, has acquired the turbine-pump division of the Roots-Connersville Blower Corporation of Connersville, Indiana, company officials have just announced.

"THIS BUCKET'S GOT WHAT IT TAKES"

◄ Tearing out this old Baldwin Locomotive Works foundation at Philadelphia was about as tough a test as a bucket ever gets. Wm. Geppert, Inc., owners of the bucket, report that the ½-Yard Williams Multiple Rope did an extraordinary job in digging into and removing the massive stone and heavy chunks of concrete.

Powerful in biting and gripping, fast in action, and ruggedly built with welded construction at vital points, Williams Buckets are without a superior for hard service.

Bulletins describing all types of Williams Buckets sent FREE *on request.*

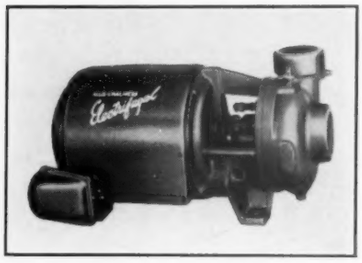
THE WELLMAN ENGINEERING CO. • 7014 Central Avenue • Cleveland, Ohio

WILLIAMS *Buckets*
built by WELLMAN

● Pump Unit

The Allis-Chalmers Manufacturing Company, Milwaukee, announces its new "Electrifugal" pump which is an all-in-one centrifugal pump especially designed as a complete pump and motor unit on one shaft and one housing. Instead of using standard motors having special end housings and shaft extensions, the "Electrifugal" pumping unit has a special motor with a one-piece cast-iron motor yoke and pump bracket. The feet are cast integral with the housing and bracket and extend under the entire unit instead of under the motor only.

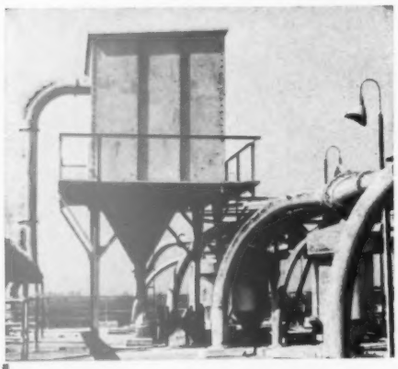
The special motor design, with copper bearing steel cover, meets N.E.M.A. specifications for splash-proof motors. Totally-inclosed, fan-cooled motors and explosion proof motors



Self-contained pumping unit.

are also available in the "Electrifugal" type.

In splash-proof construction the "Electrifugal" pump is now available in sizes from 1 to 10 horsepower inclusive at 3,500 r.p.m. and from ¾ to 7½ horsepower inclusive at 1,750 r.p.m. for heads up to 160 feet. Larger sizes of this type are in the process of design.



Use Modern

SLY DUST FILTERS

TO SOLVE YOUR

DUST PROBLEM

Sly Dust Filter installations are not expensive in first cost. Many hundreds of them pay for themselves. ¶ Sly Dust Filters clean the air completely by *filtering* the dust out of it. ¶ Ask for Bulletin No. 98. It contains valuable data on how to meet a dust problem. ¶ Send details of your problem and we will gladly give you an estimate.

THE W. W. SLY MFG. CO.

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4745 Train Ave. Cleveland, O.

Trade Literature

The Strayer Portable Concrete Plant on the "Penn Pike." (folder) Erie Steel Construction Company, Erie, Pennsylvania.

Working a Quarry with Euclids. (4 pages) Euclid Road Machinery Company, Cleveland.

Ajax Vibrating Packer. (4 pages); *Conveyors and Feeders.* (4 pages); *Vibrating and Vibroplane Screens.* (4 pages) Ajax Flexible Coupling Company, Westfield, New York.

The Story of Modern Industrial Weighing. (folder) Exact Weight Scale Company, Columbus, Ohio.

Standard Dredging Pumps. (4 pages) Lawrence Machine & Pump Corporation, Lawrence, Massachusetts.

Something New in Distribution Transformers. (4 pages) Allis-Chalmers Manufacturing Company, Pittsburgh.

The Lincoln Weldirectory. (56 pages) Lincoln Electric Company, Cleveland.

Denver Vertical Centrifugal Sand Pump. (4 pages) Denver Equipment Company, Denver.

Two-Line Lever Arm Buckets. (36 pages) Blaw-Knox Company, Pittsburgh.

Valves . . . Pipe Fittings . . . Hydrants. (240 pages) Kennedy Valve Manufacturing Company, Elmira, New York.

Direct Firing of Rotary Cement Kilns. (24 pages) Babcock & Wilcox Company, New York.

Oil Circuit Breakers. (8 pages) Roller-Smith Company, Bethlehem, Pennsylvania.

Earth-Moving Tools and Tractor Equipment. (8 pages) Heil Company, Milwaukee.

V-Belt Data Book. (168 pages) B. F. Goodrich Company, Akron.

Steel Plate Roller Bearing Pulverizers. (6 pages) Universal Crusher Company, Cedar Rapids, Iowa.

INCORPORATIONS

Oro Grande Lime & Stone Corporation, Los Angeles. $50,000. P. C. Thompson, R. B. Murphey and Walter E. Bennett.

H. & B. Rock Company, Contra Costa, California. $1,500 shares n.p.v. Hardy G. Hutchinson, Forrest C. Brown, and M. D. Hutchinson.

Lime Point Quarry Company, Portland, Oregon. $5,000. J. M. Louthitt and L. M. Latourette.

Mica Corporation of America, Indianapolis. 1,000 shares @ $100. Fred V. Lee, French E. Poe and Rex E. Poe.

Silica Sand Company, Inc., Detroit. $200,000. Robert E. Bratton, Donald F. Pascoe, and Leroy M. Hull.

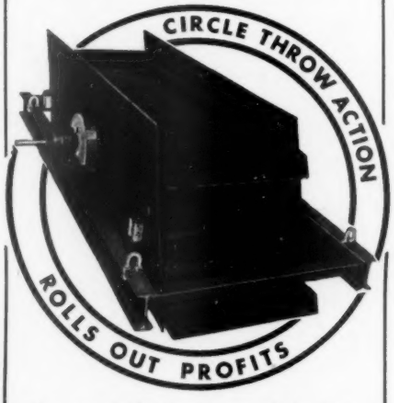
Cement Products Company, Inc., Lubbock, Texas. $1,000. Leslie Niell, James Caserta and Leo Chesley.

Neville Brothers Quarry, Glasgow, Kentucky. $60,000. Earl and Cleo Neville.

Highland Ground Limestone Company, Monterey, Virginia. $10,000. Stewart Bolling (Cleveland, Ohio) and R. Turner Jones.

NEW HOLLAND

Vibrating Screens



You can profit by the use of the New Holland Screen with the "Circle Throw" principle which boosts screening capacity and reduces production costs. Extra heavy duty construction that insures long service life and continuous operating economy. Full range of sizes, one to three decks.

New Holland Roll Crusher with pulsating feeder that doubles output. Standard sizes—capacity up to 100 tons per hour.

Write for Bulletin

NEW HOLLAND MACHINE CO.

New Holland Pennsylvania

THAT'S WHERE TO STAY IN ST. LOUIS!

HOTEL Mayfair

DOWNTOWN - REAL FOOD AND SERVICE - NEARBY PARKING - PRIVATE BATH RADIO RECEPTION

UNUSUAL OPERATING PROBLEMS ENCOUNTERED IN PRODUCTION OF AGGREGATES FOR CHEROKEE DAM

THE T.V.A. has opened and operated a large number of quarries in connection with its various dams and other construction projects since the beginning at Norris Dam seven years ago. Some of the best aggregates-plant operators in the country have seen service on these jobs and contributed modern ideas and methods. Engineers of the Bureau of Reclamation at Denver have also given advice on these vast operations.

In spite of the unusual operating problems encountered on previous T.V.A. projects, it is quite possible that the new Cherokee Dam presents a more interesting picture to aggregates producers than all the others. Cherokee is an Emergency National Defense Project, being built for the express purpose of producing power needed by the Aluminum Company of America in turning out much needed material for the aviation industry, on war and national defense orders. Lee G. Warren is project manager at Cherokee Dam and Ed M. Murphey is superintendent. George K. Leonard is project engineer. Aggregates for the concrete section will involve one and one-half million cubic yards, and approximately 400,000 cubic yards of stone 12 inches and smaller is being produced under contract by the Birmingham Slag Company.

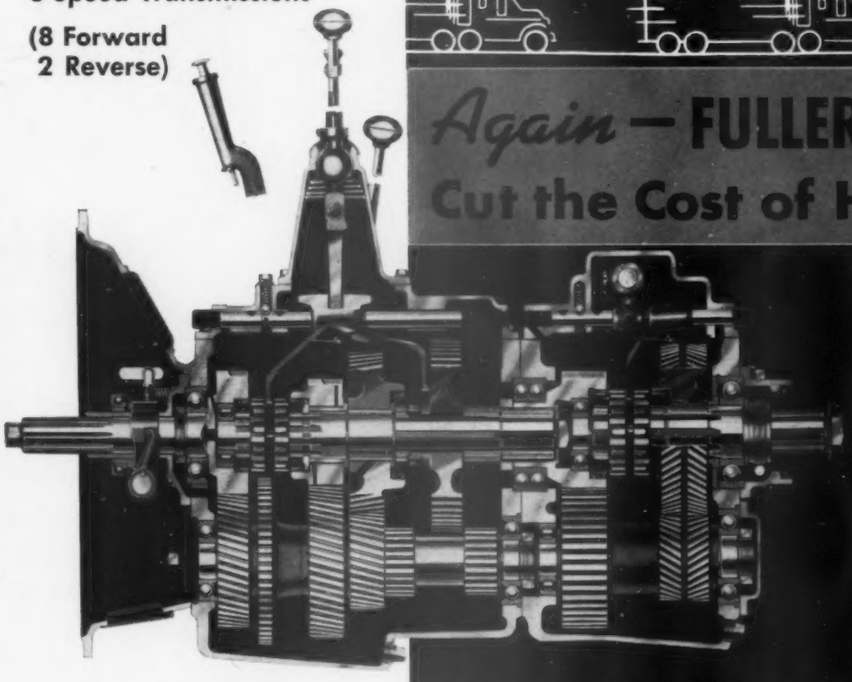
Unforeseen problems in connection with the filled sections of the dam were met by application of old and new methods, two of which necessitated opening two new quarries by the T.V.A. The nature of the earth and structure of the dam itself calls for the use of nearly 1,000,000 cubic yards of rip-rap stone. There will also be over a million yards of stone used in certain portions of the filled section of the dam proper in addition to the earth-filled section. This stone is needed to provide the proper stability and to insure permanence.

Another use for quarried stone is in refilling a drainage tunnel 500 feet long, and 6 feet in diameter. This tunnel was erected to carry off water from a large spring found in the foundation of one of the fill sections. In line with experience gained on previous jobs only heavy-duty equipment is used by the T.V.A. in quarrying and delivering the stone to its destination. Among the various items in use in this connection are thirteen Hug quarry trucks, Marion and Bucyrus-Erie shovels, Bucyrus-Armstrong blast-hole drills for primary drilling, and Gardner-Denver drills for secondary drilling.

In connection with the Birmingham Slag Company's contract for concrete aggregates, it is interesting to note that this company is also using a number of Hug quarry trucks, which were bought from the surplus property division of T.V.A. before this emergency project was contemplated. These older trucks had been used on Norris, Wheeler and Pickwick Dams and after being overhauled are again in service in the quarry of the new owners feeding the big crusher at the Mascot quarry.

Shovel and some of the trucks in the quarry.

8-Speed Transmissions
(8 Forward
2 Reverse)



8 choices of 8 speeds. 8A and 8B series provide 2.27:1 reduction in rear section. 8C and 8D series provide 1.32:1.

Again — FULLER Transmissions
Cut the Cost of Heavy Hauling

Fuller 8-A86 transmissions, used in the majority of HUG Trucks employed on dam building projects, have proven notably successful in off-the-highway service, as well as in heavy duty transport. These units are very quiet in operation, highly durable, and they provide the wide range of closely graduated gear ratios required to handle big loads under bad conditions.

FULLER MFG. CO.
Kalamazoo, Mich.

IT PAYS — to Specify FULLER
Transmissions and Auxiliaries

A GRAND TOTAL OF 29 HUGS FOR T. V. A. TO DATE

THE Tennessee Valley Authority has purchased twenty-nine Hug Trucks for their quarrying operations on the Wilson, Norris, Hiawassee, Gilbertsville and Cherokee Dams. These twenty-nine Hug trucks were chosen because they were specifically designed for heavy duty quarry work and have the stamina and ability to produce capacity tonnage under all conditions.

In quarry after quarry Hug Trucks are proving their economy in operation. On scores of jobs throughout the country they are setting enviable records of performance. Check their records the next time you visit the T.V.A. Dam projects or any privately owned, Hug equipped quarries, and see for yourself how Hugs produce tonnage at such a low cost.

THE HUG COMPANY

HIGHLAND, ILLINOIS

TVA Cherokee Dam's Newest Hug Trucks
GENERAL "ROCK SPECIAL" EQUIPPED!

HUG TRUCKS haul capacity loads of stone and rock for the mammoth TVA Cherokee Dam at Jefferson City, Tenn. They run over ground that is "murder" for most tires.

The fleet of 12 Hugs recently added to other units were all delivered on General "Rock Special" Tires.

The General "Rock Special" stands up where other tires fail. Exclusive design permits an *extra thick, heavy, tough tread* that provides exceptional cushioning protection for the carcass —and resists bruising and cutting. General's famous greater carcass strength, and Top-Quality in every ounce, allows maximum loads to be hauled—no matter how tough the going.

The "Rock Special"—like each General Truck Tire—is built to do its job better, at lower cost. Have your General Tire dealer fit a trial set of "Rock Specials" to one of your trucks. Give them "the works" and judge for yourself.

THE GENERAL TIRE & RUBBER COMPANY
AKRON, OHIO

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GENERAL TRUCK TIRES

Hug Motor Truck, equipped with Shuler Front Axle, on road construction job in Illinois.

TOUGH? SHULER AXLES CAN TAKE THE WORST KIND OF BEATING!

It's plain to be seen—an axle's got to be *good* to stand up under the torture of tough road-building jobs! And, as *most* of America's builders of heavy duty trucks and trailers have discovered, Shuler Axles have what it takes!

No, you don't see proportionately as many Shuler Axles under light delivery equipment, on well-paved city streets, as you do when you go back to the logging camps, the pipe-line operations, the new road projects.

But whatever the use, Shuler Axles will give you the *ultimate* in service, at *no extra cost*. We'll be glad to prove it to you—with quotations. Write for specifications and prices—today!

BETTER SERVICE!

Many of Shuler's best customers were first won by our eagerness to be helpful in emergencies—such as in rapidly getting out troublesome "specials" and small orders. We invite you to test our cooperativeness on any of our products:

- Shuler Square and Tubular Trailer Axles
- Shuler I-Beam Trailer Axles for Utility or House Trailers
- Shuler Front Axles for Trucks, Tractors, Farm Machinery, etc.
- Shuler Truck and Trailer Brakes
- Shuler Heavy-Duty Brakes and Trunnion Axles for Low-Platform Heavy-Duty Trailers
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SHULER AXLE CO., *Incorporated*, LOUISVILLE, KY.

Export Division: **38 Pearl St., New York, N. Y.**

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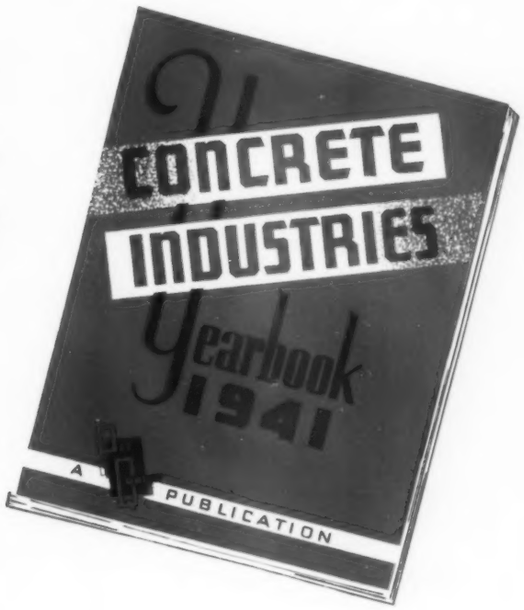
SHULER AXLES AND BRAKES

The CONCRETE MANUFACTURER

A Special Section of...

Send Your Request in NOW for the 1941 Edition of

CONCRETE INDUSTRIES YEARBOOK



Since its first appearance two years ago the *Concrete Industries Yearbook* has been in greater demand than the available supply. The 1941 edition, ready in January, will be revised to include the latest trends in the production and marketing of concrete products and ready-mixed concrete. New equipment will be illustrated and described. Catalog pages will present the new and improved equipment you will need in what is predicted will be the busiest year the concrete industries have experienced in more than a decade.

The 1941 edition will be distributed free of charge to recognized producers of concrete products and ready-mixed concrete who request it on their letterhead. Be sure to state just what you produce (concrete block, brick, pipe, ready-mixed concrete, etc.) when making your request.

PIT AND QUARRY PUBLICATIONS

538 South Clark St. **Chicago, Ill.**

The CONCRETE MANUFACTURER

December, 1940

A SPECIAL SECTION OF PIT AND QUARRY DEVOTED TO PRODUCTION MARKETING AND USES OF CONCRETE PRODUCTS AND READY-MIXED CONCRETE

Published by Pit and Quarry Publications
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Many to Exhibit

Because of the large amount of concrete construction, both private and public, involved under the national defense program, concrete contractors throughout the United States are focusing their attention on their annual conference to be held in Chicago, February 10, 11 and 12, at Hotel Sherman.

Sessions of the three-day conference, which will be held concurrently with the Concrete Industries Exposition and the annual conventions of concrete-products manufacturers and cast-stone producers, will be devoted to an exhaustive study of the newest and most efficient methods of modern concrete construction practice. Leading men from all branches of the concrete industry and prominent research authorities will be included in the list of speakers at these open-forum meetings.

Tying in with these conventions, manufacturers of equipment and materials employed in concrete construction and the manufacture of concrete products are planning extensive exhibits of their products at the Concrete Industries Exposition. Designed to implement the technical advances of the industry, the very latest machinery developed for the mixing, manufacturing and placing of concrete will be on display.

To allow the thousands of concrete men who will be in Chicago attending their several conventions an ample opportunity to see the exposition, convention sessions will be held in the mornings and the exposition will be open in the afternoons and early evenings.

Fifty per cent. more space than was available for the 1939 exposition has been added for the forthcoming show and although the opening date is still more than two months away, more than 80 per cent. of the space is already taken.

Introduces New Slab

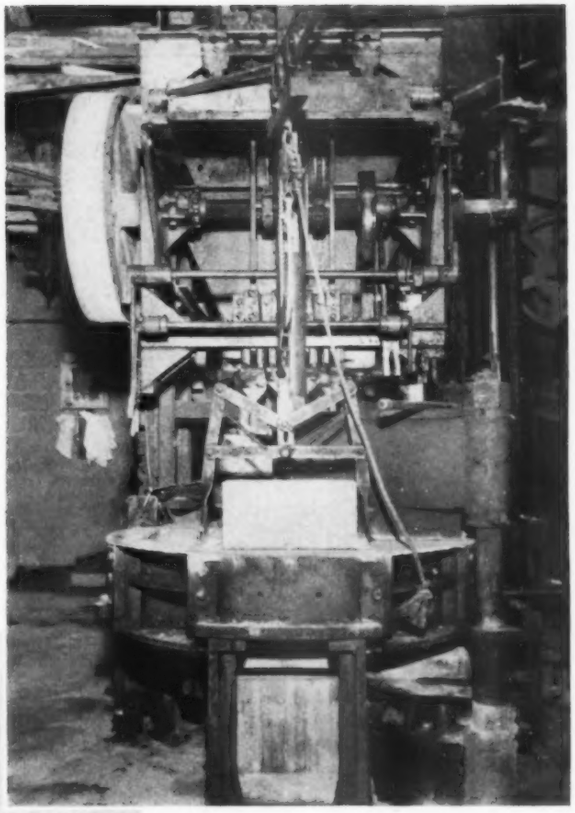
The Badger Concrete Company, Oshkosh, Wisconsin, is producing "Mo-Sai" architectural slabs for Wisconsin, Illinois, Minnesota and Upper Michigan. Herman Frauenfelder, expert in the production of Mo-Sai, has been at the Badger plant instructing its workmen in the art of making the new product.

Erects Plant Building

A new building 74 by 86 feet in size is being erected at Evansville, Indiana by the Concrete Supply Company to house its concrete-units plant.

A 90-mile hurricane with torrential rains at Savannah, Georgia, recently provided a unique and highly satisfactory test for United States Housing Authority damp-proofing standards. Storm-driven rain fell at the rate of an inch an hour for 14 hours but failed to penetrate the concrete-masonry walls of the recently-completed Fellwood Homes Project. One of the 72 dwelling units comprising the project is illustrated above. The Superock blocks were supplied by Clarke & Clarke of Savannah. The finish was two coats of Portland-cement paint.

PRODUCES UNITS OF HIGHEST STRENGTH ON TAMPER-PRESS OF UNUSUAL DESIGN



RIGHT—The block machine with tamper at rear and hydraulic-pressure unit at right. Note the mold-boxes in turntable.

BELOW—The plant building and some of the blocks in the yard.

PIONEERS in the concrete-products field, Keny Brothers of Columbus, Ohio, continue to win their share of the available business in the highly-competitive area in and around Ohio's capital city. Recent important jobs on which this concern supplied all the concrete blocks include the new Kraft Cheese Company's warehouse, the Jaeger Machine Company's office building, and the new plant of the Columbus Plastics Company. Keny blocks have also gone into 75 apartment houses built during the last two years by the contracting firm of Wallace, Ackley & Company.

All units manufactured in the Keny plant are produced on a high-capacity hydraulic press which the company built in its own machine shop. The firm assembled its first press about a quarter of a century ago and has continually added improvements until today it is a highly-efficient machine. A conventional type of 8-bar power tamper is used to give the concrete its preliminary consolidation in the mold boxes, four of which are arranged on a 50-inch turntable. After tamping, the table makes a one-quarter turn and hydraulic pressure is applied, compressing the material in the mold box about ¾-inch. On the next quarter turn the freshly-made block is ejected upward and borne away, the final quarter turn leaving the mold box empty, ready for the insertion of a cored pallet and the resumption of the production cycle. An unusually wet mix is employed. Two Louis Allis 7½-horsepower motors drive the hydraulic pumps which build up a pressure of 130,000 p.s.i. This equipment is located in a special room adjoining the production department.

Aggregates consist of crushed limestone and river gravel and are trucked in and stored in bins above the mixer floor, where a 14-cubic foot Multiplex mixer prepares the concrete batches. A hydraulic-powered skip bucket handles the concrete to the hopper of the block machine. Normally 21 standard units are obtained from a bag of cement and regular tests by the Columbus Testing Laboratories show the units consistently exceed 2,000 p.s.i. of gross area. Absorption is extremely low, averaging about 3.7 per cent. Curing is done in conventional moist rooms.

Barrett and Lewis-Shepard lift-trucks are used to handle the hinged-type racks. The racks and the ribless cored-steel pallets are made by the company in its machine shop.

Keny Brothers have just completed the installation of one of their combination tamper-hydraulic pressure machines in a concrete-products plant at Somerville, New Jersey. It is the fourth machine of its type that has been installed in this plant, the first having gone into service about 20 years ago.

Mixer and batch boxes above.

The CONCRETE MANUFACTURER

Fresno Aggregates Firm Opens Mixed-Concrete, Mortar Plant

Concrete-mixing plant of the Grant-Pacific Rock Company at Fresno, California.

WITH an ever-increasing demand for ready-mixed concrete, the Grant-Pacific Rock Company, Fresno, California, realized that a modern, economically-operated plant would be necessary if it were to maintain the position in concrete service it had occupied in the past. Having acquired the property and mortar plant of the Thompson Construction Company, at Divisadero and Tehama Streets in Fresno, it was decided to remodel and convert this structure into a modern ready-mixed-concrete and retail-materials plant as well as a mortar plant.

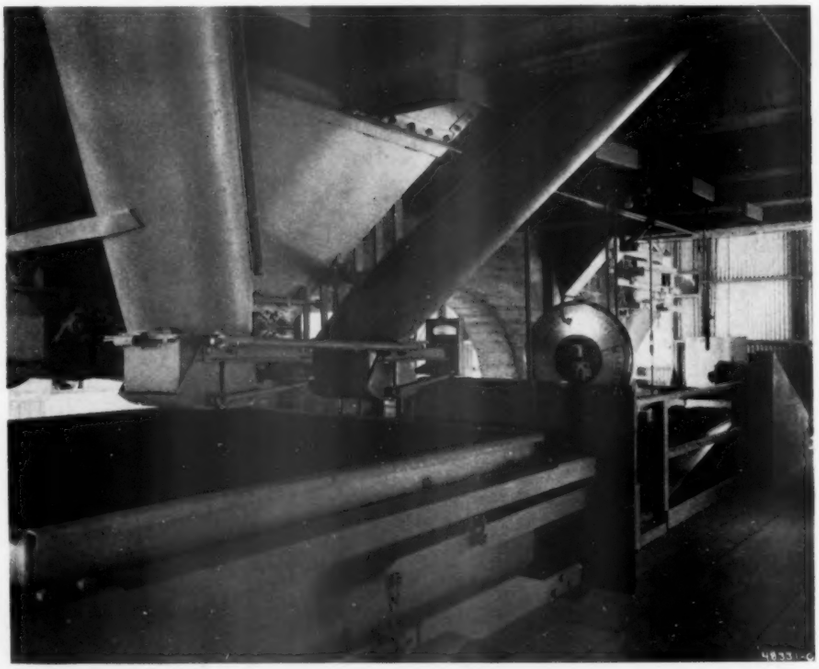
The original mortar plant, built about twelve years ago, was a two-story reinforced-concrete structure, 100 feet long, 40 feet wide and 22 feet high, designed for supplying ready-mixed brick mortar and lime putty. In the new plant about a fifth of the space is used for the same operation; the lime being slaked and pumped up 18 feet to 5 thickening vats on the second floor over the mortar pug-mills. By this arrangement enough floor space was obtained to build a concrete storage bunker, 32 feet wide, 68 feet long and 24 feet deep, providing a storage capacity of about 2,000 tons in 14 separate compartments. To compensate for this added weight four rows of continuous footings were added to the existing foundations, which extend to hardpan.

All the materials are received in a concrete track hopper, 12 feet by 24 feet, having very steep sides to self-clear all the materials except cement entering the plant. A 30-inch belt-conveyor feeder on 27-foot centers, extends from the track hopper to the 20-inch continuous bucket-elevator on 70-foot centers. A 30-inch belt-conveyor "booster" extends across the gallery from the elevator to the 30-inch shuttle conveyor traveling over the bunkers. This 20-inch shuttle conveyor, on 25-foot centers, is shifted by a hand winch-wheel located in the center of the conveyor gallery for "spotting" material to any desired compartment. When the shuttle is in the extreme west position, plaster or mortar sand is discharged on a 24-inch belt feeding two vibrating screens placed back to back for cleaning the sand before its final discharge to the bunkers. When the shuttle is in the extreme east position, raw lime is discharged directly to the dust-tight lime-storage bin which has a capacity of about two carloads.

Cement is received in 20-ton capacity semi-trailer trucks with 14-cubic yard bodies, the largest in the company's fleet. When these trucks are not hauling cement, the cover plates are hoisted off and the trucks are used to haul sand, gravel and rock from the company's pit at Rockfield, near Friant, California, a distance of approximately 12 miles.

The plant is also served by a railroad spur track which will accommodate 12 cars.

The cement receiving hopper, 9 by 12 feet, contains a 12-inch screw-feeder for the 12- by 7-inch bucket-elevator, which was formerly used for elevating raw lime in the old mortar plant. This elevator discharges directly into a 600-barrel silo. Running from the silo is a 12-inch screw feeding a 30-foot automatic cement-hopper scale equipped with a photoëlectric "eye," assuring a positive cut-off through an air-operated gate to prevent after-dribble. A short



Aggregate-weighing hopper, loading belt and (in background) the cement-weighing hopper.

12-inch screw driven by a 1½-horsepower motor discharges the cement from the scale hopper into a truck-loading gathering hopper at the same time that the aggregate batch and mixing water are passing through. About 22 seconds is required to deliver a 4-cubic yard batch to a mixer-truck below. Six bunker compartments discharging into a 4-cubic yard weigh-hopper assure a supply of 12 carloads of sand and four grades of gravel for concrete batching, while the other compartments supply the demand for bulk loading of various aggregates.

End view of plant showing elevators from track hopper.

From the 4-cubic yard scale hopper of 20-ton capacity the material is dumped on a 36-inch loading belt on 28-foot centers, through an air-operated clam-shell gate by remote control. This belt delivers to the gathering hopper over the truck-loading lane at the same time that the cement and water are being admitted. The water is accurately measured by a Repeat-O-Matic meter, assuring the correct amount of water for any batch or specification, this water being retained in a 250-gallon surge tank over the gathering hopper.

During the preliminary laying-out of the plant, pre-shrinking mixers were considered, but after study it was decided to drop the pre-shrink idea and develop the gathering-hopper principle by mixing through a whirlpool drop to the mixer-trucks below. By simply admitting a 40-inch water pipe from the surge tank into the gathering hopper at about a 45-degree angle along the inside a very lively vortex or whirlpool developed, which at the same time flushed the hopper sides clean of cement at each successive batch. The advantages obtained by this whirlpool principle are the avoidance of the loss of loading time waiting for two mixed batches, and the cost of another built-in mixer, requiring additional height to elevate the materials. In checking batches it has been found that from ½ to 1 cubic yard can be loaded into mixer-trucks over their rated capacity, resulting in a greater pay load.

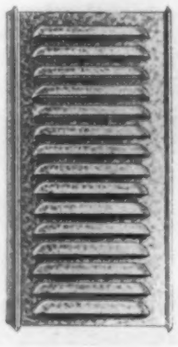
With this continuous-pour system the "bottle-neck" of a plant is eliminated, as the capacity of a wet-mix plant is determined by time required to remove the lids from mixer-trucks, replace them after loading, and pull out of the way of the truck behind, rather than the time required for making another batch.

The company has a fleet of 5 mixer-trucks ranging in rated capacities from 1 to 3 cubic yards, with a variation in loading-hole height of 22 inches. To compensate for this range a telescopic steel loading trunk, 20 inches in diameter and attached to the gathering hopper, is raised or lowered with a lever at the side of the loading lane by the driver taking a load.

The Grant-Pacific Rock Company, organized nearly two years ago, leases those plants of the Grant-Service Rock Company and the Pacific Coast Aggregates, Inc., located in the South San Joaquin Valley, and in addition operates building-material yards in Fresno and Selma, California. The president is R. F. Felchlin; the vice-president is A. K. Humphries; the general manager is A. R. McMillan; the sales director is Vaughn R. Horstmann.

Metal Crib Staves

Ventilated metal staves which are used alternately with concrete silo staves for the erection of corn cribs are being produced by the New Monarch Machine & Stamping Company of Des Moines. These metal staves can be used with the concrete staves molded on the Anderson machine manufactured by the New Monarch concern or with any other standard silo stave.



Metal stave used in conjunction with concrete silo staves to erect corn cribs.

The metal corn-crib staves are made of 16-gage galvanized steel, 10 inches wide and 20 inches high, with 15 embossed louvers for ventilation. Openings are about ¼ by 7 inches giving a ventilated area of over 25 square inches to each stave. Special intermediate, top and bottom staves and flue covers are also available.

The CONCRETE MANUFACTURER

KENT CONTINUOUS MIXER

FEATURES:
Mix automatically proportioned
Continuous thorough watering
Super-efficient mixing
Self-aligning bearings
Extra sturdy construction
Instantly variable output
Various drives available

Reduce labor time and operating costs by installing a KENT Continuous Concrete Mixer. Preferred by leading concrete products plants.

THE KENT MACHINE CO.
CUYAHOGA FALLS, OHIO

Will not BREAK, CRACK or WARP

Blocks made on cored pallets are better blocks because they are more uniformly cured and cheaper to cure. Cored pallets permit use of machines which leave no core bar marks or weak places beneath core bars either on faces, ends of corner block, or webs.

The user of cored pallets is not limited as to the range of core sizes. He buys cored pallets with the maximum air space and produces blocks with smaller air space by using shouldered cores.

THE COMMERCIAL SHEARING AND STAMPING CO.
YOUNGSTOWN, OHIO

Some of concrete runways and stocks in the yard. Units being sprayed at right.

The vibrating block machine in operation.

Supplies Over a Million Blocks for Work in Boulder Dam Area

WHEN Boulder Dam or any of the surrounding territory is mentioned most people think of a vast desert area. Many of them would be surprised to know that a commercial concrete-products plant has been operated since 1932 in Boulder City, Nevada, only a few miles from the dam. It is operated by the Boulder City Builders' Supply Company, which opened a builders' supply and lumber yard in 1930 under a government concession. The Flam block machine installed at that time made over one million blocks before it was displaced late in 1939 by a new Flam vibrator machine. The old machine supplied blocks for all the business buildings, garages, government-owned houses and some of the privately-owned houses built when the dam construction work was in progress.

The plant has had a steady sale for its products since the dam was completed. The permanent population of Boulder City, now about 3,000 has shown a steady increase due largely to the growing popularity of the dam and Lake Meade among tourists and to their development as a recreational area. Four departments of the government have been located there to conduct experiments in the use of electricity in processing metals, non-metals, etc. The Southern California Edison Company recently completed 15 houses for its employees, the Los Angeles Bureau of Power and Light recently spent $85,000 for an administration building, garage and warehouse. All this construction was of concrete blocks. A recent ruling that all houses must have a permanent foundation has created a considerable demand for blocks.

The greatest future demand is expected to come from the development of the recreational facilities in this area. Contemplated for the near future are a resort hotel and cottages to cost over half a million dollars. Other smaller cottage developments are already under way. Concrete building units are preferred for all construction because of the wide range of temperatures, which reach 120 degrees in summer and drop to 10 degrees in winter. All the buildings have provisions for artificial heating and cooling.

The sand and fine gravel used in this plant are obtained from a wash 18 miles away and are so clean they need only to be screened before being used. A ½-cubic yard mixer discharges the concrete to the new Flam block machine. Flam wooden pallets with patented metal clips are used. The finished units are loaded on racks by hand, but a Flam electric-friction overhead hoist is used to handle large units. A Revolvator mechanical lift truck moves the loaded racks to outdoor storage after they have been kept under cover over night. They are then sprayed steadily for 48 hours after which they are sprayed twice daily. A permanent sprinkler system is used.

Supt. R. S. Webb preparing to move a rack-load of units.

Over 100,000 blocks can be stored and all are accessible to concrete walks so that any desired group can readily be loaded out. There is a center walk 50 feet long with four 50-foot wing walks.

The block machine is operated with any of six molds. At one time it can make two 4-by 8-by 12-inch or three 4-by 6-by 12-inch blocks, eight bricks, 4-by 8-inch or 4-by 6-inch specials, or half blocks. A 1:6 mixture is used for

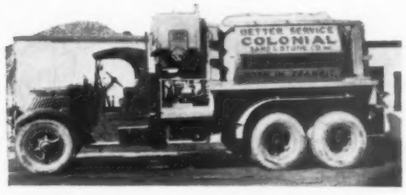
Theater, stores and apartments in Boulder City owned and built by Paul S. Webb, head of the company, using his own concrete blocks.

most work and an average strength of over 3,000 pounds is obtained. With a crew of 3 men from 1,500 to 2,000 of the 4- by 8- by 12-inch blocks are made daily.

Paul S. Webb is owner of the Boulder City Builders' Supply Company. He also built and operated the hotel and originated the Boulder Dam tours. He is still a stockholder in these. Mr. Webb also operates a hardware store, a motion-picture theater and an apartment building, and does practically all the contracting outside the dam proper. His brother R. S. Webb, is superintendent of the block plant.

• Largest Truck-Mixer

The world's largest transit concrete mixers, a fleet of giant units that provide 8 cubic yard payload (equal to 16 tons of mixed concrete) are being put in service by the Colonial Sand & Stone Company, Inc., of New York. They



One of the large truck-mixers.

were developed by the Jaeger Machine Company, of Columbus, Ohio, based on the "New York Special," 5½-cubic yard model, over 150 of which are being operated in the metropolitan area.

The complete unit, mounted on a six-wheel truck powered with a 150-horsepower Diesel engine, stands 12 feet high, is approximately 26 feet long and weighs 31½ tons when fully loaded. The mixing drum is driven direct from the truck engine and, by means of vacuum control, the operator is able to start and stop the 16-ton load of the revolving drum merely by flipping a valve at the steering wheel.

The drum is equipped with two top charging doors. After enough material to produce five cubic yards of concrete is received through the first door, the machine then moves forward to bring the second door under the charging hopper where the remainder of the eight-yard batch is received.

The total capacity of the water tank is 325 gallons, consisting of mixing, flushing and tempering water, all of which are controlled from a single panel on the tank.

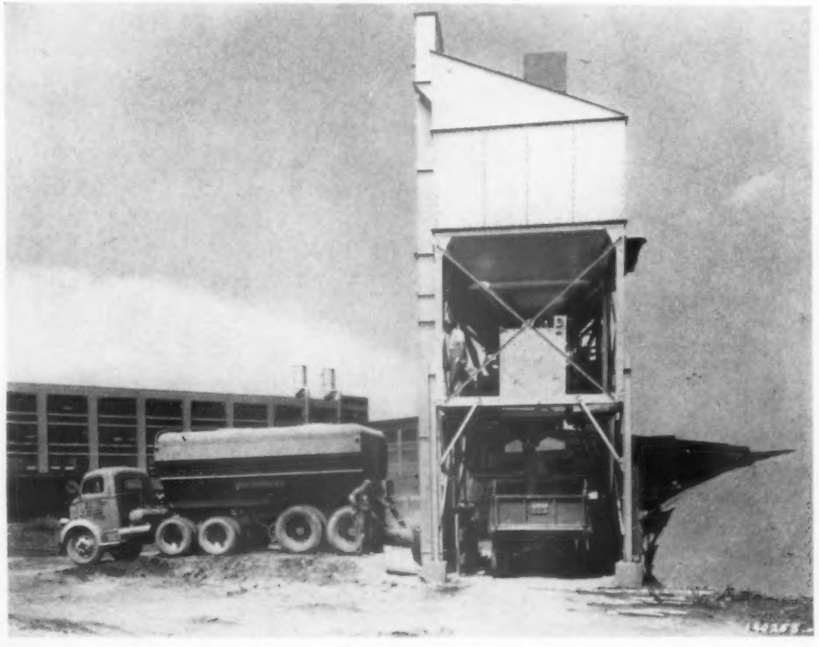
Adds Another Plant

The Ready Mixed Concrete Corporation recently placed a new plant in operation at Indianapolis. Like other plants of the company it employs the central-mixing process, 2-cubic yard mixers being used. The company is now able to produce and deliver in its fleet of agitator trucks about 1,500 cubic yards of concrete per day.

Enter Equipment Field

The Kramer Hi-Speed Tamper Company has recently been incorporated at Peoria, Illinois. The company will manufacture machinery and equipment for the manufacture of concrete block and brick.

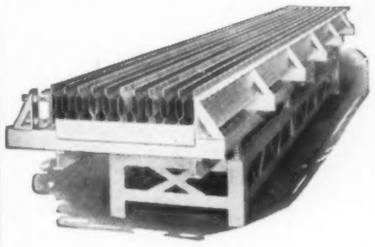
The Flint & Walling Manufacturing Company has purchased the R & L Concrete Machinery Company of Kendallville, Indiana, and will continue to supply the well-known R & L line.



Bulk-cement trailer, manufactured by the Universal Trailer Company, Detroit, delivering a load of cement to the elevator of a ready-mixed-concrete plant. Unloading is accomplished by spiral screws, the cement being discharged dust-free through a chute at the rear of the body at a rate of about 5 barrels per minute. Loading is done through two manholes in the roof of the trailer. The capacity of the trailer is 90 barrels.

KIRK & BLUM

STEEL FORMS for CONCRETE JOISTS



Made in Standard 20-Ft. Lengths —also in special lengths to meet individual requirements.

HEAVY DUTY VIBRATING TABLES can be furnished for this equipment.

We manufacture Sewer Forms—Curb and Gutter Forms—Steel Concrete Forms of All Kinds. Details on request. Write—no obligation.

THE KIRK & BLUM MFG. CO.
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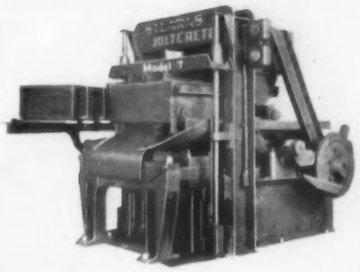
The Vibration Machine Supreme

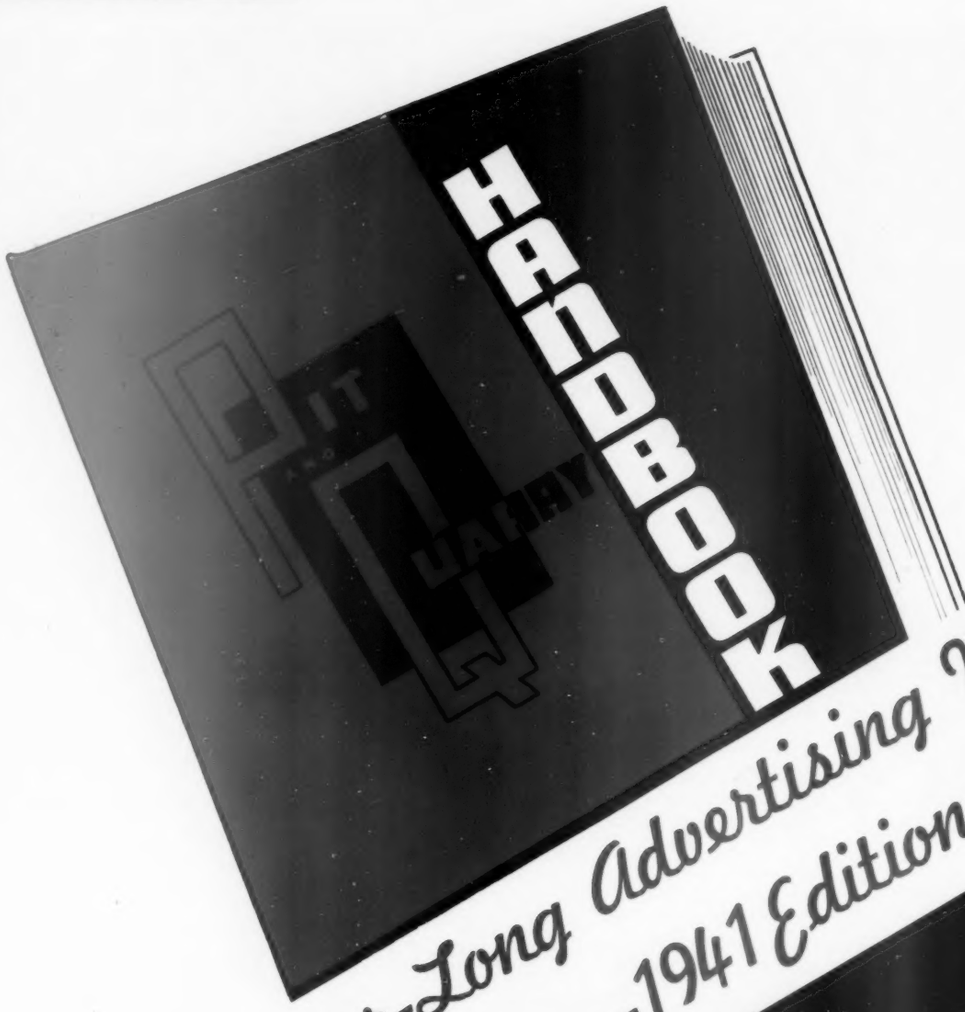


Vibration under pressure — 7,200 blows per minute—and ruggedly built to give long life, the Joltcrete machine is the choice of the wise concrete-products operator. Produces clean-cut, high strength units in any size, and gets the most out of a bag of cement. Built in three sizes with capacities of 7 to 9 standard units per minute.

Hobbs block machines, Anchor tampers, Anchor Jr. strippers, Stearns power strippers and Joltcrete, Stearns mixers, and Cast Iron and Press Steel pallets, Straublox oscillating attachments, etc. Repair parts for: Anchor, Ideal, Universal, Stearns, Blystone mixers and many others.

ANCHOR CONCRETE MACHINERY CO.
G. M. Friel, Manager **Columbus, Ohio**

The CONCRETE MANUFACTURER



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—both with the same EXCLUSIVE FEATURES that have made Jaeger the WORLD'S LARGEST SELLING Truck Mixers, Agitators

2 YD. UNIT ON SHORT WHEELBASE FORD-TYPE TRUCK

HIGH DUMP TRUCK MIXERS AGITATORS

IN 2, 3 AND 4 CU. YD. SIZES FOR UTILITY SERVICE

With One-Shot Loading, Dual-Mix Drum and Flip-of-Finger Vacuum Controlled Discharge Door, these units are fastest to load, mix and discharge of any high discharge type on market. More compact for economical mounting, maximum truck payload (2 Yd. can mount on short wheelbase Ford). Meet difficult placing problems (even 2 Yd. can dump into hoppers, big buckets or over dirt piles); fit into needs of small towns as well as fleets of Standard Jaeger units.

In *Both* Types, You Get These Features That *Jaeger Alone Can Offer:*

1. Dual-Mix Drum with Throw-Back Reversing Blades, producing higher strength, more workable concrete as proved by the Hollister Tests.
2. Two-Speed Shock-Proof Transmission with either Vacuum Cab-Controlled Truck Engine Drive or Separate Engine.
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7. Cor-Ten Steel, which resists both corrosion and rust. Highest type automotive construction throughout, insuring lowest maintenance.

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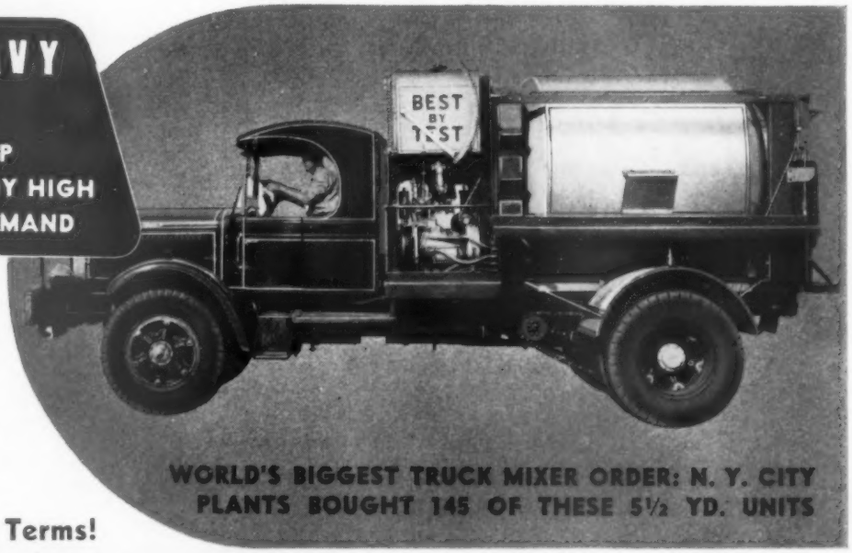
TRUCK MIXER SIZES UP TO 8 CU. YDS. FOR STEADY HIGH PRODUCTION—ANY DEMAND



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The CONCRETE MANUFACTURER

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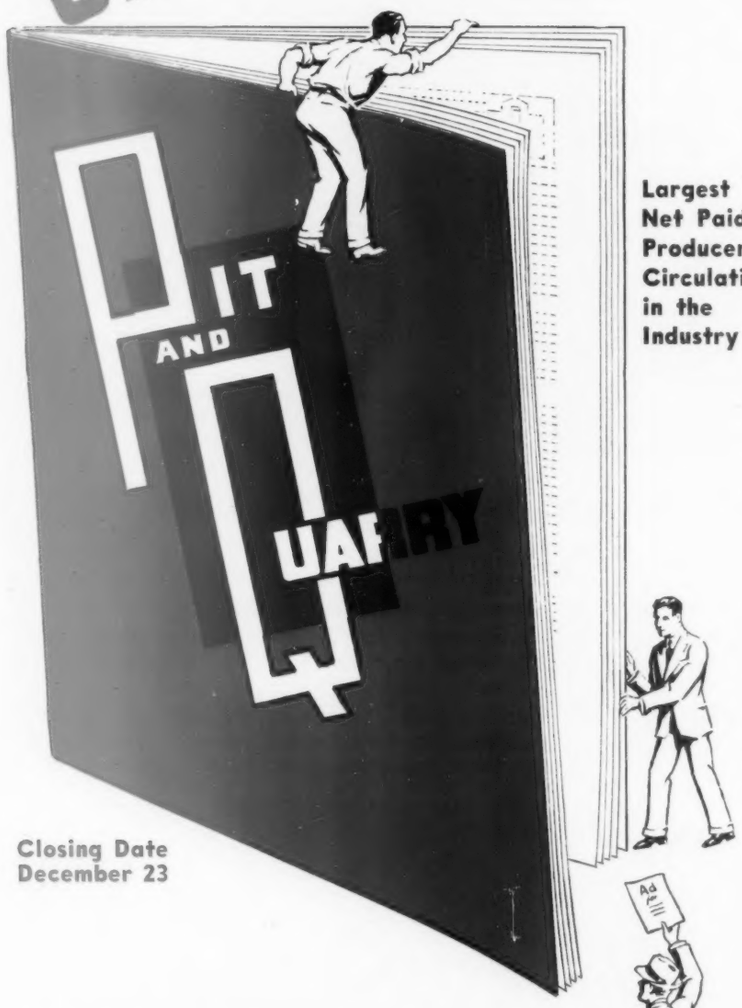

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January PIT AND QUARRY will contain a complete résumé of the past year's developments in methods, machines and materials—a wealth of valuable data for producers, engineers and purchasing agents.

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A large section of January PIT AND QUARRY will be devoted to descriptions and illustrations of new equipment—a parade of mechanical progress—up-to-date information that every progressive operator will want to have.

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START YOUR 1941 CAMPAIGN with an advertisement in January PIT AND QUARRY—the best buy of the year.

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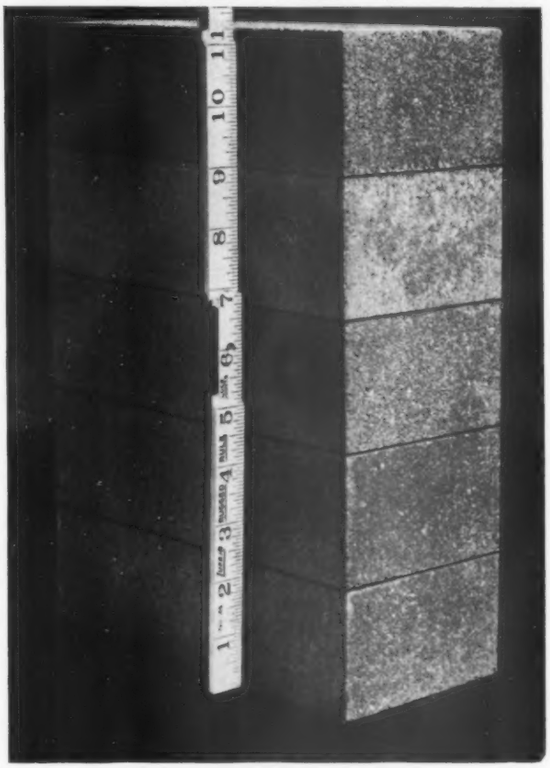
"AND EVERY ONE ALIKE"



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JACKSON BRICK MACHINE

Producers using the JACKSON concrete brick machines are outselling their competitors. Their profits are greater because their operating and maintenance costs are lower.

The JACKSON brick machines have been in use for over 25 years, they are hard to wear out and will pay for themselves over and over again.

Completely automatic, no slowing down. Day in and day out these machines turn out an endless stream of concrete brick. Production set by the machine, not by the labor.

No other concrete brick machine on the market today makes brick without the use of pallets. This feature alone will more than pay for the machine in a very short time.

Let us show you why the JACKSON concrete brick making equipment is the most efficient and economical to own.

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To Builders and Users of Block Machines:

Please take notice that the Stearns Manufacturing Company of Adrian, Michigan, are the sole and exclusive licensees of "Joltcrete" vibration block machine patents and patent rights and have the sole and exclusive right to manufacture and sell such equipment.

At the present time there is a suit for patent infringement pending against H. W. Bell Company of New York City, a user of infringing equipment.

Others manufacturing infringing equipment and the users of such equipment will be prosecuted to the fullest extent of the law.

LOUIS GELBMAN, *Inventor*

HOTEL PHILADELPHIAN
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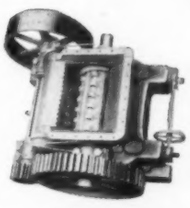

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Single and double roll and jaw crushers, hammer mills, super dry pans—steel log washers and scrubbers, sand drags, revolving and vibrating screens, elevators, conveyors, dryers, jigs, hoists.

SCREENS

Complete portable, semi-portable and stationary crushing, screening and washing plants for different capacities of any materials.

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More complete than even the fine show of 1939—occupying new enlarged quarters!

The *only* major concrete machinery exhibition planned in 1941.

That only begins to describe the importance of the 1941 Concrete Industries Exposition. The past year has been no ordinary one in the advancement of concrete equipment design. All kinds of new and more efficient tools, accessories, mechanical devices and materials await your inspection.

Come and mix with the boys, and see these units that are going to *affect your methods, your bids, your profits in what promises to be a boom construction year.*

Concrete contractors, concrete products and ready-mix men, home builders interested in the fast-growing use of concrete and concrete products—general contractors, engineers and public officials—this is YOUR show! Plan now to attend.

COME... SEE HOW IT'S DONE IN '41
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THE ORIGINAL BUCKETRUX

(Tilt-Type)

DEMPSTER-DUMPSTER Model 300LF illustrated above mounted on a 117-in. wheelbase truck chassis has a capacity of 3 cu.yds. (9,000 lb. net load). This unit is handling both the Drop-Bottom and Tilt-Type Buckets. All DEMPSTER-DUMPSTER hoisting units are designed to handle these, as well as the Skip-Type Buckets, with equal efficiency. Sizes available up to 6 cu.yds. in various designs.

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Investigate . . . Check with the Operators Who Use Them . . . Write for Details of Our Trial Offer

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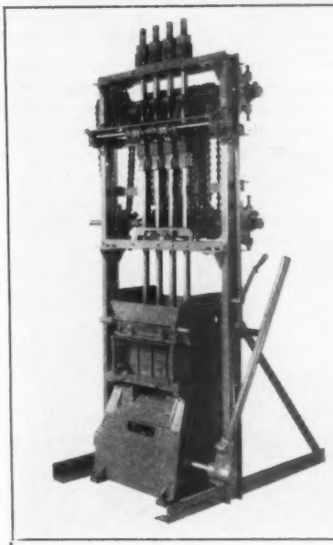

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THE MILES MANUFACTURING CO.

Department 21

JACKSON, MICHIGAN

The above screening plant turns out 400 tons of graded aggregate per day and is kept supplied with raw material from a gravel bar by a ¾ cu. yd. Sauerman Slackline Cableway.

SAUERMAN efficiency means greater economy and higher PROFITS!

Here is a 3 cu. yd. Sauerman Scraper that delivers 2,000 tons of gravel per day from hill to plant conveyor.

Excavating and stockpiling is no problem when you use a SAUERMAN Machine.

These machines dig, haul and dump in one economical straight-line operation. Readily adaptable to varying digging conditions, they will move a given yardage in less time than any other machines of comparable price.

Because they require but a single operator, consume little power in operation, and require practically no maintenance, they are extremely inexpensive to operate. *Write for Catalog.*

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434 S. Clinton St. CHICAGO

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The CONCRETE MANUFACTURER

Wanted a PRODUCER

TO MANUFACTURE an improved building product of highest quality at lowest cost—a product that has proven itself in actual permanent construction by reducing costs to level of frame.

TO SUPPLY the entire building trade with more attractive and permanent construction with proven savings at every step, all the way from manufacturing to the finished job.

YOUR COMMUNITY will welcome your contribution to better buildings at lower cost. Your builders and prospective home owners are waiting for this better, lower cost material.

IF YOU ARE THE MAN we will equip you with exclusive line production machinery—Large production. Only one or two men. Equipment costs but fraction of other processes of equal capacity.

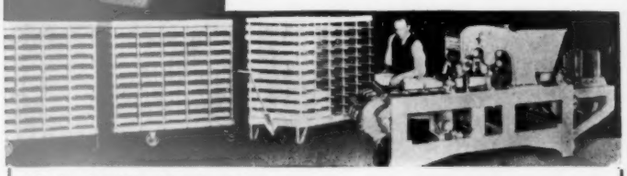
WE WILL SUPPLY YOU with processes to enable you to supply product in 40 colors, shades and textures. Your product will be capable of meeting all known building requirements and is now being used by Government-City Building Depts. throughout the country.

WE WILL GRANT YOU Manufacturing Franchise covering your locality—protecting your market, business and future, with available engineering and advertising service.

YOUR EARNING POWER AND FUTURE. Present manufacturers have pioneered the way for you. Some are selling at 100% over cost. Some are getting as high as 80% of the business in their territories.

YOUR OPPORTUNITY IS COMPLETE. Ready made. One that is proven. Ready for you to cash in on the great building upturn under way.

YOU SHOULD INVESTIGATE while your territory is still open. Fill in and return coupon today. No obligation.



W. E. DUNN MFG. CO.
420 W. 24th St., Holland, Michigan 12-40

Show me through your free books the proven possibilities of this business and the earning power of an exclusive plant in this territory.

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Address .....

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10 Years Experience Designing and Perfecting HIGH DISCHARGE TRUCK MIXERS

One of the early Models — forerunner of the Modern Smith-Mobile.

1930
1931
1932
1933
1934
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1936
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1940

Back in 1930, Smith engineers had visions of a new truck mixer that would eliminate leaky and tiresome loading hatches, troublesome rear discharge doors, clogging water bells and inefficient low discharge.

After six years of intensive research and field tests, the new Smith-Mobile was announced — a HIGH DISCHARGE Truck Mixer equipped with feed chute instead of loading hatches and including many other exclusive features that make for more efficient and convenient operation.

Today, Smith-Mobile is in its fourth year of quantity production. It's a thoroughly tried and tested product, enthusiastically approved by ready-mixed operators, contractors and U. S. Engineers. Hundreds of Smith-Mobiles are now giving satisfactory performance on jobs all over the country.

Why gamble with new and untried machines? Get the complete Smith-Mobile story. Ask for Catalog 198-A just off the press.

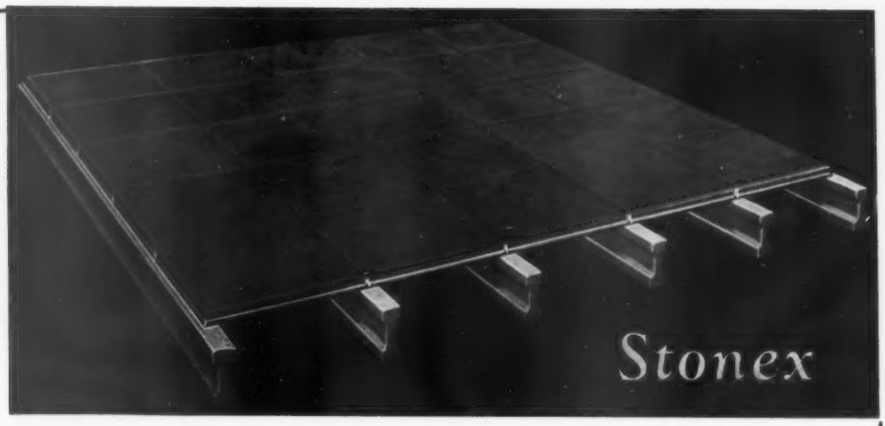
The T. L. SMITH COMPANY
2887 N. 32nd St. • Milwaukee, Wis.

1941 Model No. 4 Smith-Mobile 4-1/3 yds. Capacity. 5¼ yds. Agitator.

SMITH-MOBILE
THE *Modern* TRUCK MIXER and AGITATOR

A 3254-½

HERE'S A NEW *LOW-COST* CONCRETE FLOOR



Here is a practical answer to the question "How can we get a good low-cost, finished concrete floor?

Precast concrete joists open the door to the low-cost floor market. STONEX clinches the sale by solving the problem of a floor finish.

The illustration above shows how simple the tile are to place . . . the speed with which a floor can be completed . . . the distinctive result that is obtained, at an amazingly low cost.

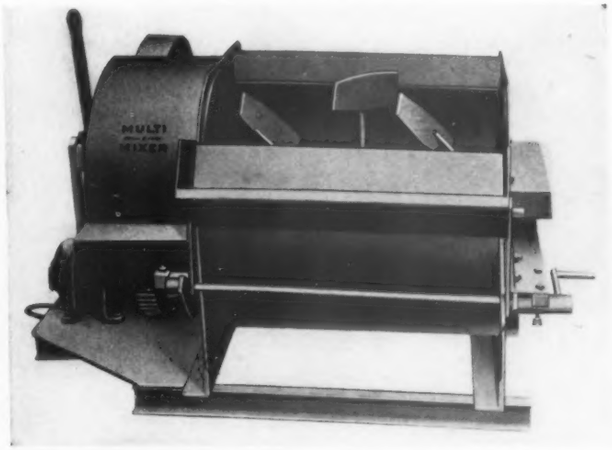
The new and exclusive STONEX process enables products manufacturers to produce—at low cost—tile of all shapes, sizes, and for all purposes . . . tile that are harder than granite, as proved by laboratory tests . . . in beautiful colors; all shades, tones and blends, that are an integral part of the tile itself.

The system has been perfected and proved by test and job experience. It is all ready for alert products manufacturers to merchandise. It is just what you need to win your local floor business.

Write today for more details about STONEX process and our plan to license manufacturers to make and sell this system

STONEX INDUSTRIES, 210 Seventy-First Street, Miami Beach, Florida

MULTIPLEX
MULTI-MIXER



- All-steel, welded frame
- Enclosed drive gears running in oil
- Shafts mounted on roller bearings
- No costly clutches or belts to replace
- End discharge door gives access at all times
- New design mixing paddles for quicker mix
- Long wearing blades and liners
- Capacities 5 to 40 cu.ft. and larger

THE MULTIPLEX CONCRETE MACHINERY COMPANY

Elmore Ohio

JOIN THE PROFIT PARADE

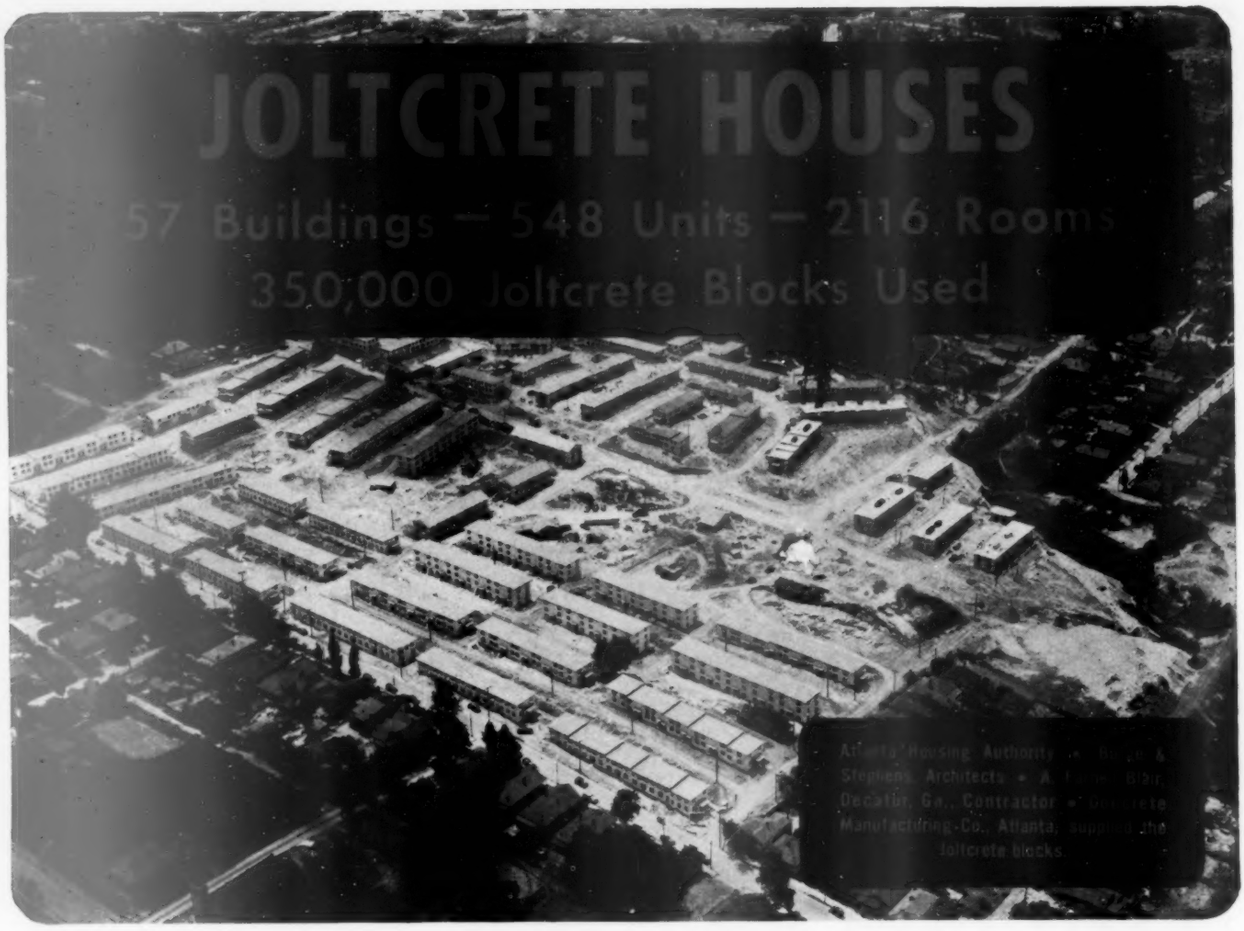
IN 1941 WITH TRANSPORT MIXERS
PROVEN PERFORMANCE

OPEN TOP—EASY TO LOAD, VISIBLE BLADE MIXING WHILE LOADING, EASY TO CLEAN.
RUGGED CONSTRUCTION—FAST DISCHARGE, SIDE AND REAR.
LOWEST FIRST COST—LOWEST OPERATING COST.
HIGHEST QUALITY CONCRETE, MORTAR AND PLASTER.
TRUCK MIXERS PLANT MIXERS.

WRITE FOR COMPLETE DETAILS AND TEST REPORTS

CONCRETE TRANSPORT MIXER CO., INC.
660 ROSEDALE AVE., ST. LOUIS, MO.

The CONCRETE MANUFACTURER



JOLTCRETE is meeting the pressing demands our National Defense Program is placing on the construction industry which now absorbs more than 250,000,000 concrete blocks annually.

As a block-maker, Joltcrete is simply unbeatable. For instance, the 350,000 blocks required on the Atlanta Housing Project illustrated above were made in 92 eight-hour days. That's figuring 8 blocks per minute—and Joltcrete will easily make nine. And fine blocks they are: clean cut, true-to-dimension, even textured—without planes of weakness or core bar marks. Joltcrete makes more good blocks per bag of cement and the results of the famous Wisconsin tests definitely proved their quality —*high strength—low absorption.*

Only Stearns makes Joltcrete which, as you know, pioneered the process of making blocks by *limited amplitude vibration—vibration under pressure.* All fundamental features are covered by patents and patents pending.

Made in three sizes—one for every need—with guaranteed production up to nine 8″ blocks per minute. Joltcrete makes block, brick or tile—anything that can be confined within a 16″x24″x8″ mold box. You can use your present cored pallets or inexpensive new ones.

More than 100 Joltcretes, all sold within the last two years—are in successful operation. Twenty-one of these machines prompted their owners to buy a second Joltcrete. This significant, practical history is not even approached by all other high production vibration machines combined. Write today for Joltcrete literature; read it, study it, see these machines in operation—*and you'll buy.*

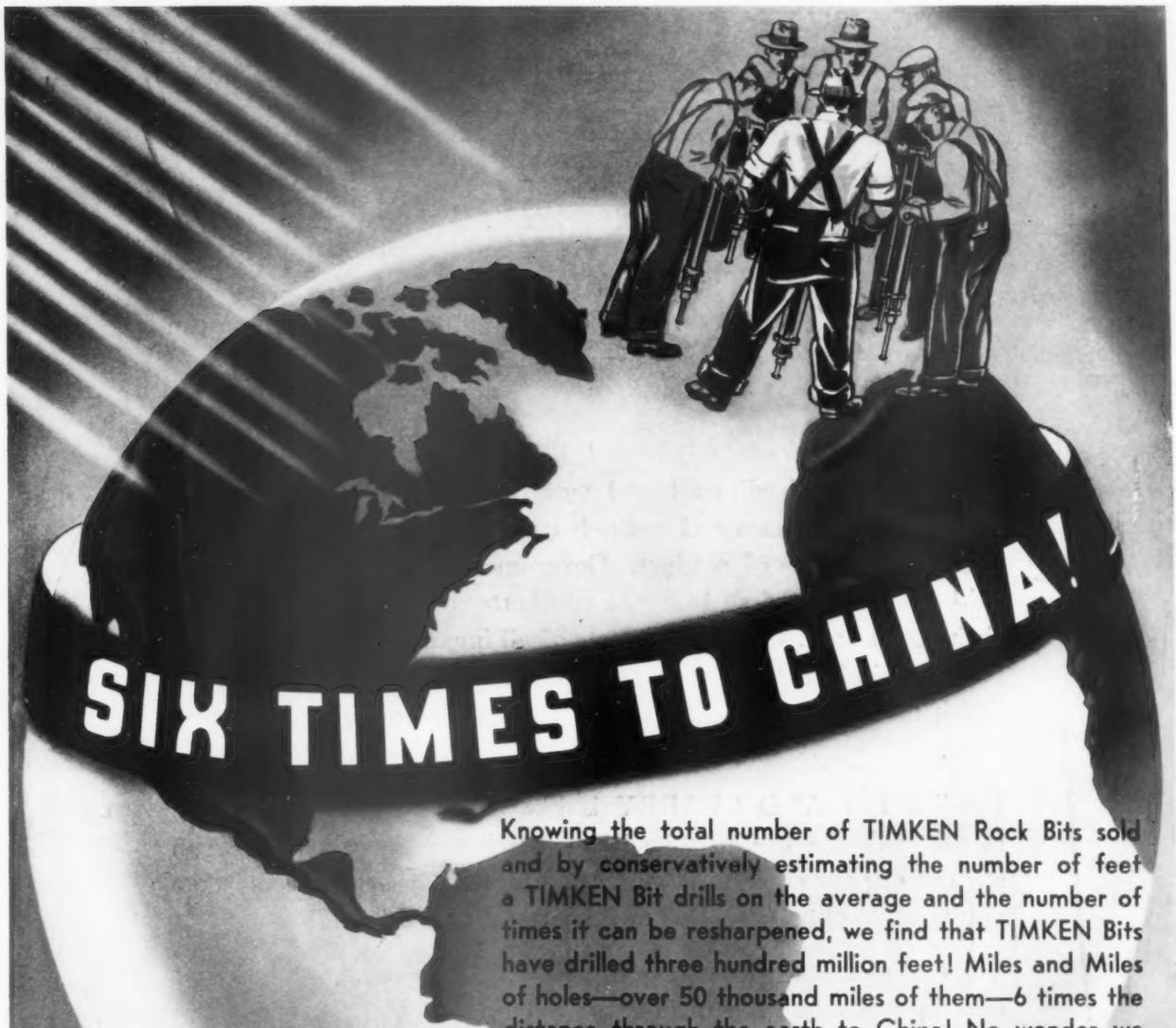
●

Stearns of Adrian is headquarters also for Tamp Type Machines, Mixers, Skip Loaders—anything you may need for a modern concrete products plant

Complete Concrete Products Plant Equipment

STEARNS MANUFACTURING CO. - ADRIAN, MICH.
GENE OLSEN, PRESIDENT

Write for folders on the machines you are interested in



SIX TIMES TO CHINA!

Knowing the total number of TIMKEN Rock Bits sold and by conservatively estimating the number of feet a TIMKEN Bit drills on the average and the number of times it can be resharpened, we find that TIMKEN Bits have drilled three hundred million feet! Miles and Miles of holes—over 50 thousand miles of them—6 times the distance through the earth to China! No wonder we can say it's "Miles of Smiles" for operators who use TIMKEN Removable Rock Bits.

Why not let us demonstrate what this widely-accepted time-tested tool will do for you. Write us immediately for the name of the nearest Authorized Distributor. No charge, of course.

TIMKEN
ROCK BITS

Manufacturers of TIMKEN Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; TIMKEN Alloy Steels and Carbon and Alloy Seamless Tubing; and TIMKEN Rock Bits.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Pit and Quarry Helps You Operate More Profitably

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TRADE MARK REG. U. S. PATENT OFFICE

WELDING ELECTRODES

(*Bare*, for D.C.; *Tite-Kote*, for A.C. or D.C.)

APPLICATOR BARS

(Round, square, flat, or special shapes)

HOT ROLLED PLATES

(For patching and fabricating new parts)

CAST WEDGE BARS

(For repointing dipper teeth)

SEACO Hard Surfacing Electrodes are a recommended finishing layer over MANGANAL—allowing the underlying metal to work-harden for greater resistance to impact and abrasion.

LEFT — MANGANAL Applicator Bars on crusher bell and liner. Attached with MANGANAL Welding Electrodes.

STULZ-SICKLES CO.

Sole Producers

134-142 Lafayette St. Newark, N. J.

Write for Name of Nearest Distributor

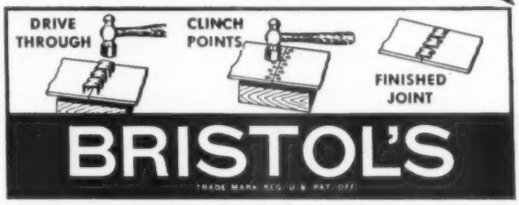
BELTS fastened with Bristol's Steel Belt Fasteners will not tear apart or loosen up at the joint . . . and here is the reason. The specially designed Bristol's points pass through the fibre or fabric without cutting or tearing. Since the fasteners are of cold rolled steel, once clinched in place they keep their shape. Even in severest belt service, these superior fasteners hold with a lock-tight grip.

For the quickest, easiest joints and repairs you ever made . . . specify Bristol's. Free samples and Bulletin 72-5W gladly sent on request. Write.

SEE HOW EASY IT IS!

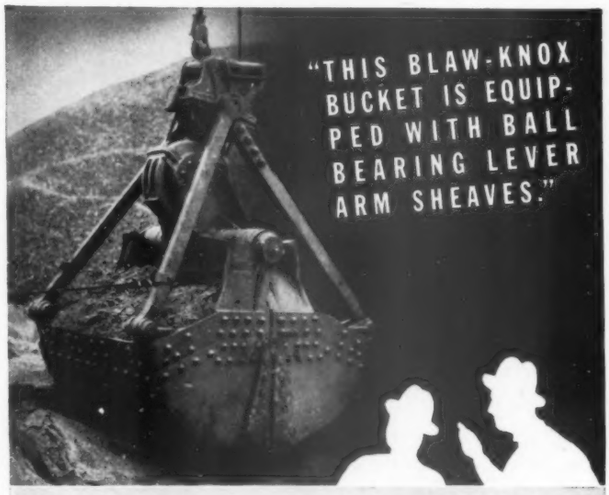
The Bristol Company, *Mill Supply Division*, Waterbury, Conn.

Branches in Principal Cities.



BRISTOL'S

TRADE MARK REG. U. S. PAT. OFF.



As a matter of fact this feature is standard equipment and does not cost more. It is especially desirable where the bucket handles loose granular materials because it keeps lubrication in and dirt out. This and many other desirable features of Blaw-Knox Buckets is fully described and illustrated in Bulletin No. 1606. Write for it today.

17

BLAW-KNOX *Digging and Rehandling* **BUCKETS**

BLAW-KNOX DIVISION
OF BLAW-KNOX CO.
Farmers Bank Bldg. Pittsburgh, Pa.

A Sincere Greeting To Our Friends . . .

As we count our blessings this Holiday Season, we gratefully remember one in particular—the friendship and faith of our customers during the past year. To them we extend heartiest greetings and best wishes for a prosperous New Year!

We cannot pass over 1940 without reflecting on the gains we have made, and those we hope to make as the years go on. Nor can we forget those pleasant business relationships which have been established wherever our services are used.

During the coming year, we are confident that our two organizations will be better able to serve our Industry. We earnestly solicit your inquiries, your continued confidence, and bespeak for you all well-deserved success.

McGANN MANUFACTURING CO.

William J. Kuntz, Pres.

LIME & HYDRATE PLANTS CO.

YORK PENNSYLVANIA

3 Big Conventions Here in January Plan to Attend!

Cincinnati

THE Netherland-Plaza Hotel in Cincinnati will be the scene of three big industry conventions in January and if you produce sand, gravel, crushed stone or ready-mixed concrete you should plan now to attend. All producers, irrespective of association membership, are urged to be present, to take part in the proceedings, the informal discussions, to inspect the new machinery and equipment which will be on display. Some of the nation's outstanding authorities will address you on topics of interest especially to you. Make your hotel reservations as soon as possible, and mark your calendar as a reminder NOW!

CONVENTION DATES

January 15, 16, 17

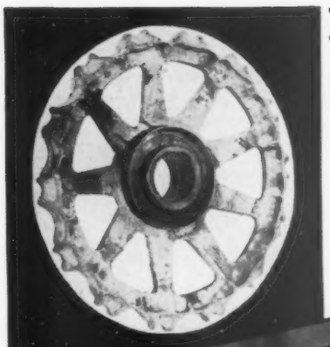
Twenty-Fifth Annual Convention, National Sand and Gravel Association

January 16, 17

Eleventh Annual Convention, National Ready Mixed Concrete Association

January 20, 21, 22

Twenty-Fourth Annual Convention, National Crushed Stone Association



MANGANESE STEEL • RENEWABLE

SPROCKET RIMS

The modern practical way... when only the teeth and rim of a worn tractor drive sprocket need replacing... is to rebuild by welding on a renewable manganese steel rim. Naturally, this costs far less than a complete new sprocket. Furthermore, these renewable rims actually outwear and outlast, being made of high grade, wear-resistant manganese steel, proven in practice. Carried in stock. Printed welding directions accompany each rim.

For Caterpillar Tractors

ALLOY STEEL & METALS CO.

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Manufacturers of PACIFIC CRUSHING & SCREENING UNITS • PACIFIC SLUSHING SCRAPERS & SHEAVE BLOCKS • Alloy-Manganese CRUSHER JAWS & MILL LINERS • PACIFIC ROCK BIT GRINDERS • HAND WINCHES • CRAWLER SHOES and Other Machinery Wearing Parts

PLACE HEADBAND WELL UP AROUND HEAD TO KEEP FROM SLIPPING DOWN
PRESS NOSE TABS IN CLOSE AGAINST FACE TO HOLD PAD AGAINST THE NOSTRILS
PRESS EDGES OF FACE PLATE DOWN TO FIT FACE SNUGLY

Made of Soft Rolled Aluminum. So light and comfortable that workers will wear them without objection.

MARTINDALE PROTECTIVE MASKS

Weigh less than ½ ounce

(Not recommended for toxic dusts or free silica)

1 Mask and 25 Refills	$1.23
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6 Masks and 150 Refills	5.40

We pay transportation charges when payment accompanies order

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PRESS NOSE TABS IN CLOSE AGAINST FACE TO HOLD PAD AGAINST THE NOSTRILS
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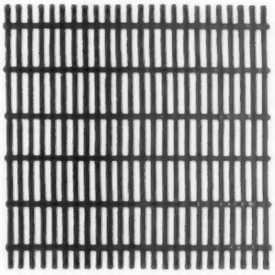
MARTINDALE ELECTRIC CO.

1405 Hird Ave. **Cleveland, Ohio**



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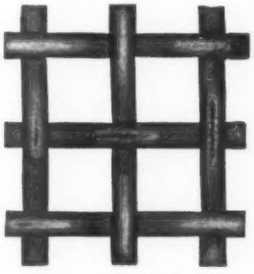
A super wearing Steel developed to resist the abrasion and vibration of modern screening demands.

"CLEVELAND" SCREENS

A wire cloth of guaranteed accuracy backed by fine workmanship and an effort to satisfy.

Available in Square Mesh and Rolled Slot. A trial will convince you of the superiority.



2 Mesh .162 Ga.

THE CLEVELAND WIRE CLOTH & MFG. COMPANY

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Come and get the Answers!

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- How do taxes affect your profits?
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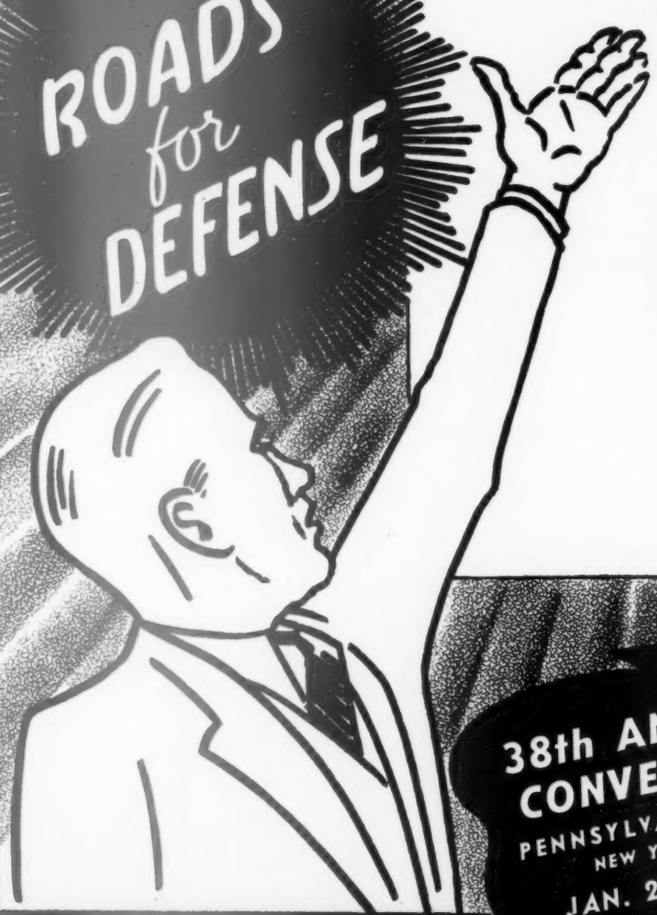
ROADS for DEFENSE

These subjects are close to your pocketbook—men who have found the answers are going to tell you about them—give you a chance to discuss them—ask questions! Here's the year's opportunity to get real help on the things that are bothering you most. *Note the date—plan now to come!*



-MOTION PICTURES
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-EXCHANGE OF EXPERIENCES
-FUN!

38th ANNUAL CONVENTION
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NEW YORK CITY
JAN. 27-31, 1941

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Sand and Gravel Operators who
"FOLLOW THE LEADER"

Eagle
EQUIPMENT

Preferred by Industry since 1872

Take a Short Cut to Profits

Dredge Operators wouldn't be without it

"Swintek" Screen Nozzle Ladder

Nozzle head manufactured only under EAGLE patents. It has no equal.

This uniquely efficient machine will pay for itself in short order by increasing pump capacities up to 300% while reducing power requirements as much as 40%. The screening and digging chain with moving cutters loosens any hard sand or gravel deposits, and insures an even flow of solids. Eliminates slug pumping. Works deep strata inaccessible to plain suction. Built for a lifetime of continuous service. Equipped with an EAGLE "Swintek," any dredge operator can "go to it" with redoubled efficiency.

EAGLE Sand and Gravel Washers, either Spiral Screw or Paddle Log Type, guarantee a high quality product that will meet all specifications. Latest improved design, with exclusive profit-making features fully protected by patents. Available in many sizes.

Ask for our Bulletin with complete details about EAGLE equipment, including crushers, grinders and shale planers.

EAGLE IRON WORKS
DES MOINES, IOWA

A 31 lb. package of Amazing Performance

NEW
GARDNER-DENVER S-33 SINKER

HERE'S another Gardner-Denver Sinking Drill achievement that brings new flexibility—new usefulness to the quarry field. Weighing only 31 lbs., the new Gardner-Denver Model S-33 Sinking Drill has speed, power and reliability that lift it far above its weight class.

Because of its light weight, the S-33 is easy to carry in the hard-to-reach places—easy to hold in any position for plugging, chute-blasting, hitch-cutting, or block-holing. Because of its amazing power and speed, it can be compared only with much larger drills in performance.

Among the S-33's outstanding features are 4-pawl rotation (instead of the usual 2-pawl)—simplified and improved valve design—exceptionally large striking area of piston hammers—easy control—quick and efficient cleaning.

Get the whole story about the S-33—and why it will mean greater progress on *your* quarry jobs. We will gladly send Bulletin on request. Write Gardner-Denver Company, Quincy, Illinois.

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SINCE 1859

We'll Send You "ROPE DOPE" regularly!

"Rope Dope" is *not* an advertising medium. It is a periodical bulletin which explains simply and intelligently the highly technical phases of Wire Rope—its applications and uses . . . There's no obligation on your part—but a lot of valuable information in store for you.

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The "ULTIMATE LOW COST WIRE ROPE"

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CUT PIT COSTS

with economical, efficient equipment

The heavy duty features and many operating advantages built into these sturdy, powerful, fast, convertible shovels, ⅜ to 1¼ yards, will give you increased production at lower cost. Write for Catalog H-3.

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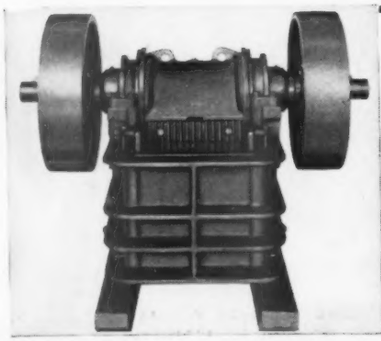
BAY CITY SHOVELS



Quick and Easy Adjustment for Various Sizes . . . . The DAY JAW TYPE CRUSHERS

Ask for details of this famous Crusher that has proved "You can't go wrong in a DAY."

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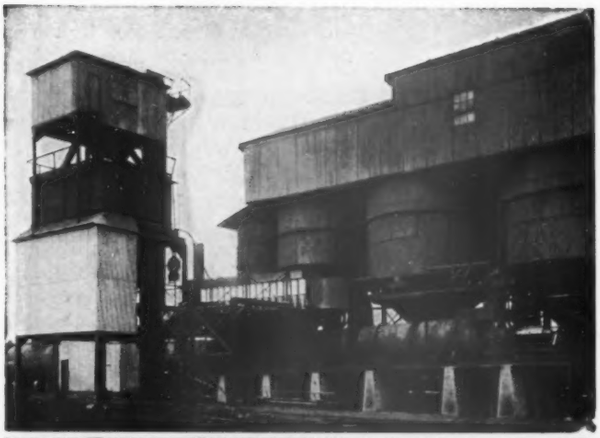
Advertise your wants and surplus equipment in

PIT and QUARRY



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HOT MIX —— COLD MIX

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COMBINATION UNIT FOR BOTH TYPES

CAPACITY DESIGN AND ARRANGEMENT TO MEET ANY REQUIREMENTS

Designed and Built

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Study this winter, Profit next spring

Better handling facilities will yield higher profits and now is the time to plan for and order them. Robins engineers are ready to suggest improvements that will pay for themselves by reducing the cost of handling. Telephone or write.

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ROUND
SQUARE
OBLONG
HEXAGON
PERFORATED
PLATE
of every description
for maximum productiveness from your vibrating screens.
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Crush Operating Costs with
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REVOLVING SCREENS
CRUSHERS DRY PANS

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books

for the CONCRETE MANUFACTURER

Concrete Industries Yearbook. 80 pages. Contains two chapters—"Concrete Units" and "Ready-Mixed Concrete." The section on "Concrete Units" completely covers the manufacture and merchandising of concrete-masonry units as well as pipe, tile, burial vaults, ornamentals, etc. The "Ready-Mixed Concrete" section covers the economics of the industry and deals with both popular methods of manufacture—central mixing, and central proportioning with mixing en-route. Plant design, operation, mixing and delivery control, supervision and administration are adequately covered, as is lime-putty.

Pit and Quarry Handbook (including the Directory of Cement, Gypsum, Lime Sand, Gravel and Crushed-Stone Plants). 792 pages, 8½ x 11½, 447 ill., 39 charts, 94 tables, cloth. Complete, concise and conveniently arranged technical reference work on all phases of designing, operating and maintaining non-metallic-mineral producing and manufacturing plants (cement, lime, gypsum, sand-and-gravel, crushed-stone, aggregates-bituminizing concrete products and ready-mixed-concrete). Accepted the world over as the standard authority.

Pit and Quarry Directory. (The Directory Section of the Handbook, published separately). Complete alphabetical and geographical lists of non-metallic-mineral producing and manufacturing companies and their plants. 254 pages, 8½ x 11½, paper.

Concrete Engineers' Handbook. By George A. Hool and Nathan C. Johnson. 800 pages. A compact reference book containing tables, formulas and data on plain and reinforced concrete. The standard authority for concrete engineers and should find a place in the library of every concrete-products and ready-mixed operator.

Basic Principles of Concrete Making. By Franklin R. McMillan. 99 pages. Mr. McMillan, who is director of research for the Portland Cement Association, undertakes a thorough, understandable discussion of the principles underlying efficient concrete mixing — a subject which many operators can profitably study.

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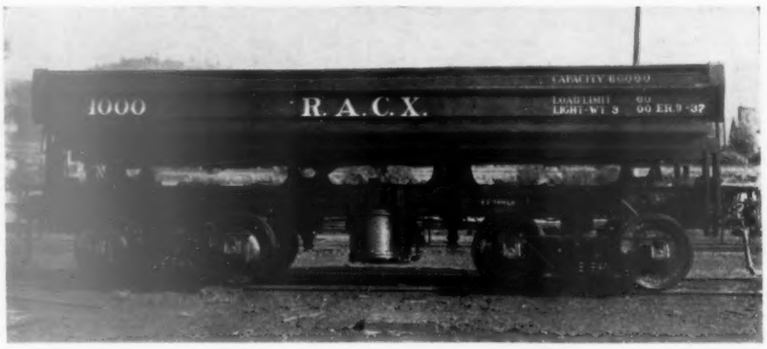

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1—8′x30″ Hardinge Conical Ball Mill, iron lined, with motor.
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3—18 ton Steam Locomotives, Vulcan and Porter, 36″ ga.
100—11½ yd. two-way Steel Dump Cars, 36″ ga.
1800 Horsepower in Electric Motors, all 3/60/440 volt; included are 150 H.P. and 200 H.P. Slip Ring Motors, 585 RPM.

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Complete concrete batching plant, Blaw Knox, 125 yds., 3 compts., 150 bbls. bulk cement.
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100 ton B.K. 3 compt. aggregate bin, weigh batcher.
72 ton B.K. aggregate 2 compt. bin, weigh batcher.
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200 ton rock storage bin, steel, heavy construction.
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Ransome 1 yd. mixer, electric, practically new.
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22—Steel stone skips, 2 to 3 yds.
1 yd. heavy duty Blaw Knox, digging, clamshell.
1¼ yd. heavy duty Blaw Knox, digging, clamshell.
¾ yd. Halss rehandling, clamshell.
1 yd Hayward orange peel, 4 leaf.
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Allis-Chalmers Model 35, with bulldozer.
Caterpillar Model 30, with L.P. bulldozer.

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2—Plymouth 20 ton, Diesel, 36″ gauge.

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Gyratory crushers: K.V.S. 30, 37-S, 49; Telsmith 32, 8A, 8B; Traylor 8″; McCully 13″, 8″, 6″.
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50—30 yd. Clark Air Dump Cars. D/T Doors.
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1—300 KW GE Switchgear
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660 "	30″	6	1/8″	1/16″	"
245 "	26″	5	1/8″	1/16″	"
906 "	24″	5	1/8″	1/32″	"
298 "	24″	4	1/8″	1/16″	"
370 "	22″	8	1/16″	1/16″	Elevator
296 "	22″	8	Friction		"
1455 "	20″	5	1/8″	1/32″	Conveyor
403 "	20″	4	1/8″	1/16″	"
1738 "	18″	4	1/8″	1/32″	"
60 "	18″	8	1/4″	1/16″	Elevator
288 "	18″	6	1/8″	1/16″	"
712 "	18″	4	1/16″	1/16″	Conveyor
1096 "	16″	4	1/8″	1/32″	"
554 "	16″	4	1/16″	1/32″	"
738 "	14″	4	3/32″	1/32″	"
288 "	14″	4	1/8″	1/16″	"
110 "	12″	8	1/8″	1/16″	Elevator
226 "	10″	6	1/16″	1/16″	"

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470 Ft.	48″	8	1/8″	1/16″	Conveyor
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50 Skips and Battleship Type, 2 to 6 Yds.
5 Owen & Bucyrus Rock Grabs.
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ORANGE PEEL: ½, 1, 1½, 2 & 3 Yds.
DRAGLINE: ¼, ½, 1, 1½ & 2 Yds. Cap.

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12 Ton KOEHRING 45 Ft. Boom Gas.
16 Ton Speedcrane, Gas, 30 Ft. Boom.
25 Ton BROWNING & 30 Ton AMERICAN Locomotive.
25 Ton LINK BELT K-48 Electric, 70 Ft. Boom.
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3½x8 & 5x7 Air Swept Tube Mills.
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6, 10 & 13 Inch Superior McCullus.
KENNEDY: Nos. 19, 25, 27, 39 & 49.
16" Traylor.
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400 Bbl. Portable BUTLER Bulk Cement Bin with Fuller Full Automatic Electric Push Button Weigh Batcher.

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5 Roll High Side.

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STEAM: 9 Ton, 20 Ton, 40 Ton, 60 Ton & 80 Ton.
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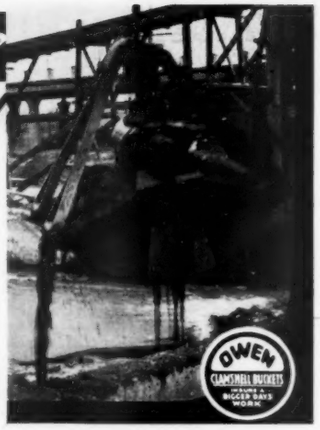

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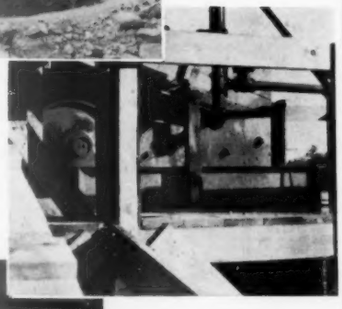

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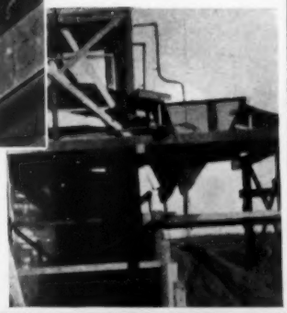

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